OAK ST LIBRARY

UNIVERSITY OF
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AT URBANA-CHAMPAIGN
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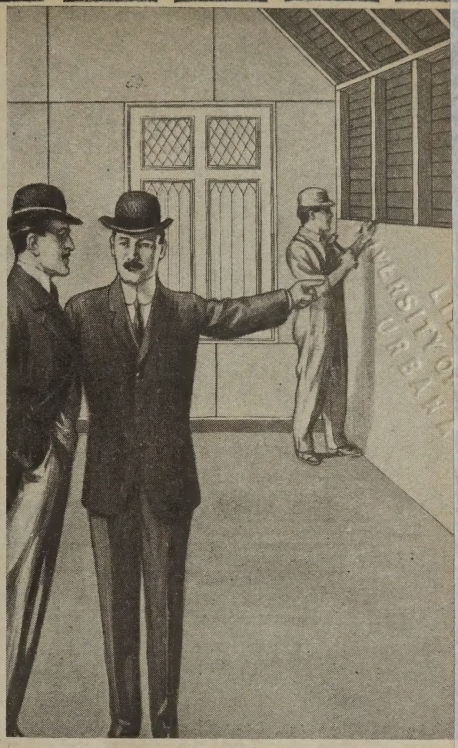
Doesn't That Beat Lath and Plaster?



Send for New Book of Home and Building Plans with Pictures in Colors. The finest book on Wall Board ever published. Enclose 6 cents in stamps for mailing. It shows you

—Bare studding made ready in an hour for any wall decoration.

—Why there is no "waiting for walls and ceiling to dry." No dirt. No dampness.

—Why at least *one month's time is saved* in building a house.

—Why Bishopric Wall Board *costs less* than plaster—wears many times *longer*.

—Why it is *sound-proof*, frost-proof —impervious to changes of temperature.

—Why anyone who can drive a nail can quickly put it on walls and ceilings.

—Why it *keeps out heat* in Summer and *cold* in Winter—*reduces fuel bills*.

—Why it does not crack, warp, sag or come loose.

—Why insects cannot live or lodge in it.

—Why steam or kitchen of laundry does not harm it.

—Why leaks in roof do not soak through or affect it.

—Why the impact of trunks or sharp corners of furniture—such as would dislodge plaster—leaves Mastic Wall Board unharmed.

—Why it stays rigid in perfection for years.

BISHOPRIC WALL BOARD is made of Asphalt-Mastic. In this Asphalt-Mastic are imbedded strong laths, as close as in plastering. This tough, strong *lath* foundation is what makes Bishopric Wall Board so firm, rigid, resisting. It is the only wall board stiffened by laths. It is unequaled for walls and ceilings of houses, business buildings, hotels, summer cottages, garages. Builders are specifying it for everything from a "sky-scraper" to the tiniest bungalow.

It comes in sheets 4 feet square. These sheets meet evenly at the edges, forming a smooth, rigid surface—ready at once for paper, paint, frescoing, burlap or any wall decoration.

In homes already occupied, remodeling is dreaded because of the dirt, delay and dampness caused by plaster. With Bishopric Wall Board it is a quick, clean, easy and inexpensive matter to partition off a bedroom, or change the shape of a hall or room or make a separate room in the basement.

Architects, Contractors, Builders everywhere, in all climates are enthusiastic over this remarkable material which so completely fills every need and requirement.

Send 6 cents to pay cost of mailing book. Free sample of Wall Board comes with it. Address

Applied Dry, Winter or Summ

Shows Construction of Bishopric Wall B

The Mastic Wall Board and Roofing Mfg. Co.

322 ESTE AVE. CINCINNATI, OHIO (46)

BISHOPRIC WALL BOARD AND SHEATHING

238084

The "ABC" of BEAVER BOARD Construction

The fifth of a series of twelve monthly talks to carpenters about the practical use of Beaver Board, the pure-wood-fibre wall and ceiling material that is durable, economical, artistic; has none of the disadvantages of lath, plaster and wall paper; and is appropriate to any type of building, new or old.*

Beaver Board is essentially a proposition for carpenters and builders.

CHAPTER V

BEAVER BOARD Advantages for Arched or Beamed Ceilings, Cove Work, Partitions, etc.

CARPENTERS often fail to understand that Beaver Board meets unusual wall and ceiling requirements as easily as ordinary ones. This is because they confuse it with plaster-board or some other material which is hard to handle.

It cannot be too strongly emphasized that BEAVER BOARD **is wood.** It is made of Pure-Wood-Fibre, pressed into sheets or panels about 3/16 of an inch thick.

It seasons tough and hard like lumber, but is so elastic that it can be modeled to curved forms and when nailed in place presents a firm, stiff surface for painting. Thus it is ideal for arched ceilings and cove-work.

This same combination of lightness with strength makes it a most convenient material for permanent, temporary or movable partitions; for office-railings, telephone-booths, closets, exhibition-booths, show-windows and so on.

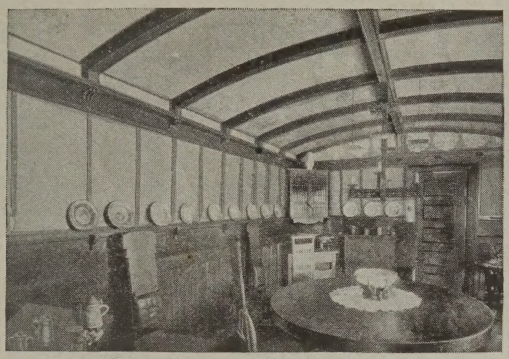
You can inclose a stairway or put in a drop ceiling quickly and economically. You can cover an old, cracked, plastered ceiling, add false beams and get a finer effect than with lumber.

Whether a wall is paneled, panel-and-wainscot, or panel-and-frieze makes no difference to BEAVER BOARD.

The work is done with saw, hammer and nails, and you always get the effect of a solid, unyielding wall.

At the same time the decoration is simple, artistic, sanitary and durable. **Beaver Board's unique pebbled surface, when painted, gives effects that you can't get either with lumber or wall paper.**

* *These chapters began in the January number. If you missed back chapters, write us—we'll mail them to you.*



Anna Katherine Green's dining-room shows Beaver Board possibilities for arched ceilings and original wall treatment

A. G. Spalding & Bros. Store—Beaver Board looks better and costs less than metal ceilings

Mr. Reynolds, Ft. Erie, Ont., made this inglenook under the stairway attractive with Beaver Board

Mr. Geo. W. Klewer has found that cove-work is anything but difficult with Beaver Board

These four illustrations are selected from scores of actual photographs, each showing some unusual or difficult problem easily solved by Beaver Board.

There Isn't Any Wall and Ceiling Problem Without a Beaver Board Answer

Write our Architectural Department and they'll tell you how to handle any job you're not quite sure of. That doesn't mean that you can do **everything** with Beaver Board, of course. We wouldn't advise you to paper over it, for instance, because painting is so much more practical, sanitary and good looking. But we'll tell you **how to get results.** Beaver Board's endless possibilities for all kinds of uses are fully described in our free booklet, "Beaver Board and its Uses," with many pictures of different interiors. Write for it today.

BEAVER BOARD

PURE-WOOD-FIBRE

Walls and Ceilings

This Trade-Mark identifies the one genuine Pure-Wood-Fibre Beaver Board.

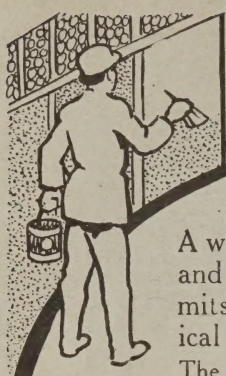
It is stamped on the back of every panel for your protection.

The BEAVER COMPANY of BUFFALO

447 Beaver Road, BUFFALO, N. Y., U. S. A.

The BEAVER COMPANY, LIMITED

387 Beaver Avenue, Ottawa, Canada **16 Eastcheap, London, E. C.**



Wall Board Painted with DULLKOTE

A wall board interior, painted with Dull Kote, is sanitary, artistic and lasting, and can be washed with a sponge like tile. It permits of tasteful decorative effects, is easily applied and economical in use.

The above are only a few of the many reasons why it is the ideal wall covering for

RESIDENCES, SCHOOLS, CHURCHES, STORES, PUBLIC BUILDINGS

But be sure it's Dull Koted.

Johnston's Dull Kote Paint contains no white lead or anything injurious. It will not rub, flake or peel off, dries hard with a washable surface, free from brush marks or laps.

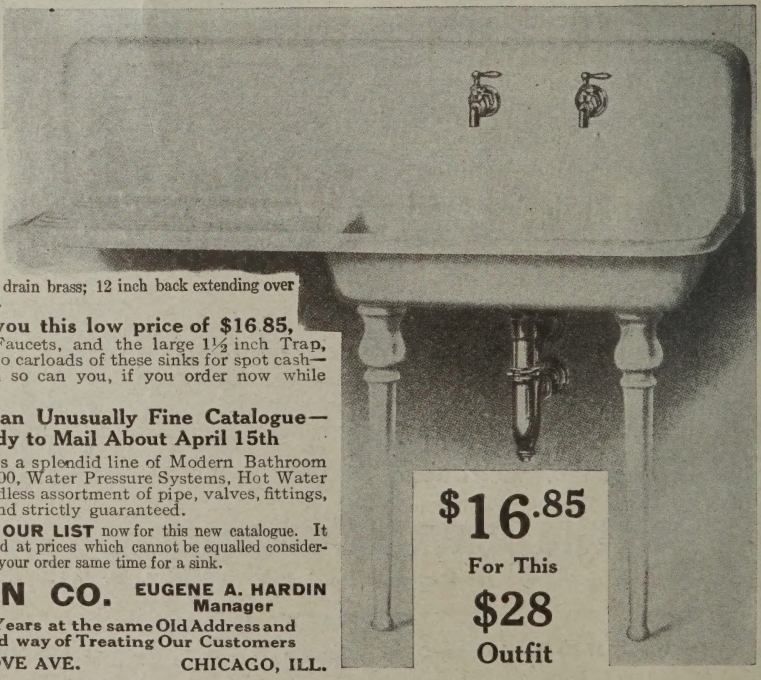
We will send any Architect, Carpenter or Owner our free color folder and valuable suggestions for interior decoration. Send your name in today.

The R. F. Johnston Paint Co.
Pearl & Main Sts., Cincinnati, Ohio

This is the Best "BUY" in Long Back One Piece Sinks you can find anywhere

Read the Description IT'S TRUE

This is a new designed Porcelain Enameled Roll Rimmed Sink, having Back and Drain Board all in one piece—Wall Hanger, Adjustable Legs, Concealed Galvanized Air Chambers, Nickel-plated Strainer, Fuller Adjustable Flanged Bibbs and "P" Trap, with waste to wall. Sink is 20 by 30 inches with 20 by 24 inch counter, sink drain brass; 12 inch back extending over sink, and runboard all in one piece.



We are able to make you this low price of $16.85, which includes two $1.50 Faucets, and the large 1½ inch Trap, simply because we bought two carloads of these sinks for spot cash—got them at a bargain—and so can you, if you order now while they last.

We Are Getting Out an Unusually Fine Catalogue—Which will be Ready to Mail About April 15th

This new catalogue shows a splendid line of Modern Bathroom Outfits, from $38.95 to $175.00, Water Pressure Systems, Hot Water and Steam Plants, and an endless assortment of pipe, valves, fittings, etc. Everything high class and strictly guaranteed.

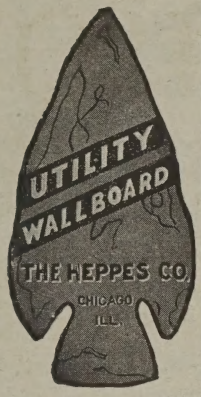
GET YOUR NAME ON OUR LIST now for this new catalogue. It will aid you in getting the best and at prices which cannot be equalled considering quality of materials. Send in your order same time for a sink.

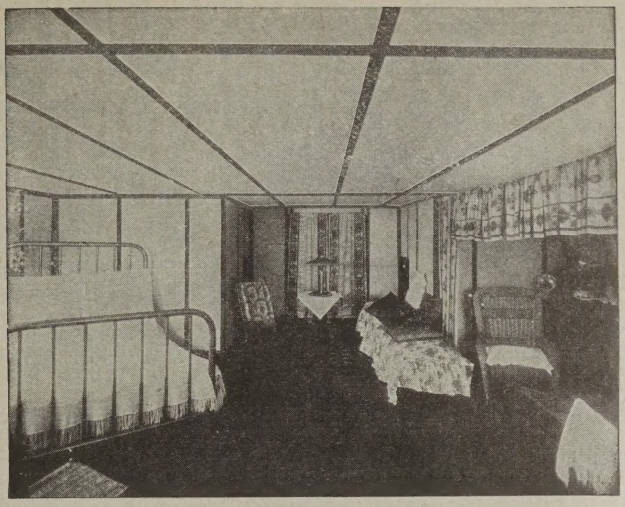
$16.85
For This
$28
Outfit

JOHN HARDIN CO. EUGENE A. HARDIN Manager

Doing Business for 25 Years at the same Old Address and in the Same Square Old way of Treating Our Customers

4541-4549 COTTAGE GROVE AVE. CHICAGO, ILL.





Over ten thousand people have written for samples of Utility Wall Board during the last three months—

That simply illustrates the keen interest that exists throughout the country in this remarkable material—

The demand for it is growing so tremendously that we are going to have to double the capacity of our big factories before the summer is over—

Doesn't that prove to you that every carpenter and builder ought to be keenly alive to the bigness of this Utility Wall Board proposition?

UTILITY WALL BOARD

is a strong, tough, durable fibre board—that does away entirely with the need for lath and plaster—

It is more easily applied than lath and plaster.

There is no muss or dirt, no tedious waiting for it to dry—it is more attractive—and more economical.

Utility Wall Board is attached direct to the studding and ceiling beams.

It can be put on by anyone who can use a saw or hammer.

And will last as long as the house stands.

It is moisture proof—will not warp or crack—has a beautiful surface and may be decorated in any way desired.

In making over an old house it can be applied directly over the old plaster if desired.

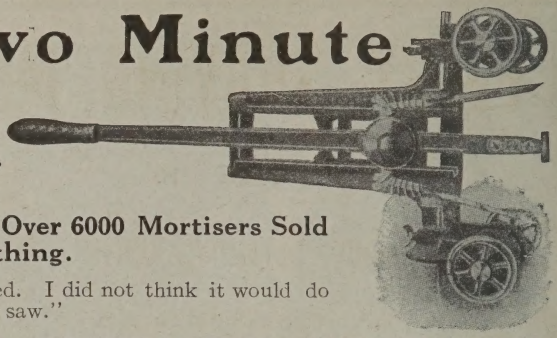
Made in sheets of all sizes up to 4 by 16 feet.

Write today for a free sample and the handsome new book of home interiors.

THE HEPPES COMPANY

4502 FILLMORE STREET. CHICAGO, ILL.

Miller's Two Minute Lever Lock MORTISER



Actual Use of Tool ½ Minute

Chisels the opening for Locks. Over 6000 Mortisers Sold Means Something.

One builder wrote us: "I was surprised. I did not think it would do the work so quick. This is the best I ever saw."

THINK THIS OVER, MR. CONTRACTOR AND BUILDER

Our patent double edge, side cutting chisel can cut more wood, four times more rapidly and 100% less exertion than any boring bit. Mortise to be of the same size.

MILLER'S TWO MINUTE LOCK MORTISERS

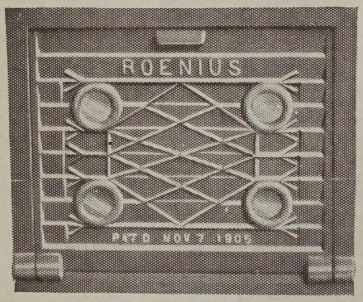
Guaranteed to be as we represent, and will send on trial to any reliable contractor and builder. We will return all money paid if it does not cut an opening in a door for a mortise lock in three minutes.

We also make a Butt Mortiser and Rule Gauge which cuts out the seats for butt hinges in soft or hard doors, jambs, and similar work, which we will send you postpaid for ***75 cents.***

A. W. MILLER MFG. CO.

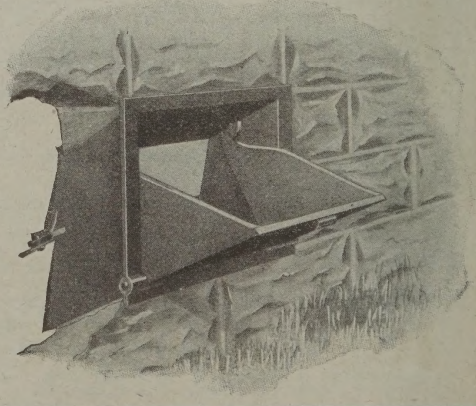
Main Office and Factory, - - - RIVERSIDE, CALIFORNIA

Eastern Office and Shops, CINCINNATI, OHIO



Roenius Wood and Coal CHUTES

Have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed.



Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked.

Roenius style B Chutes are made with glass discs—and this chute is used especially in cases where the only available light must pass through the coal chute.

Ask your dealer for the Roenius—and get the best.
Write for Circulars and Prices.

GRAND RAPIDS FOUNDRY COMPANY

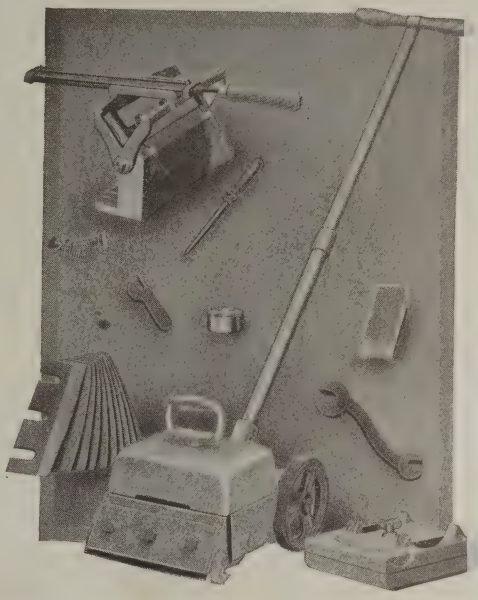
MANUFACTURERS

Grand Rapids, WISCONSIN

EVERY SHAVING MEANS A SAVING

of 75% when the

Acme Floor Scraping Outfit



is on the job—because one man with this outfit can do the work of four men using hand scrapers and do it better.

Thousands of contractors have proven this on their own work. Are you willing to be convinced? If you are, let us send the Acme Floor Scraping Outfit to you on one week's free trial, and after you have worked with it and then are not entirely satisfied, just send it back to me at my expense.

No strings to this offer whatever. Just a straight business proposition based on the principle of permitting you to try before you buy. If your dealer does not carry my outfit, then write me for booklet and further particulars.

The Acme Handy Mitre Gauge

is one of those little tools that is a great time saver. It fits in the pocket where it is always ready for immediate use. The dollar that you pay for this mitre gauge is the best investment that you ever made. If your dealer can't supply you, I can. Guaranteed absolutely accurate.

I have a circular that gives full particulars. Write for it today.

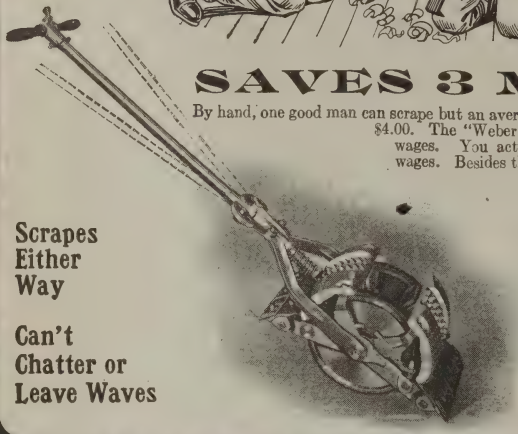
JOS. MIOTKE

249 LAKE STREET
MILWAUKEE, WIS

Relieves Tired Backs

The WEBER DOUBLE ACTING Floor Scraper

Does Better Work



Scrapes Either Way

Can't Chatter or Leave Waves

SAVES 3 MEN'S WAGES

By hand, one good man can scrape but an average of **three** "squares" a day. His wages for that are about $4.00. The "Weber" enables him to do **twelve** "squares" a day at the same wages. You actually get $16.00 worth of labor for $4.00—or save three men's wages. Besides that, it

DOES BETTER WORK

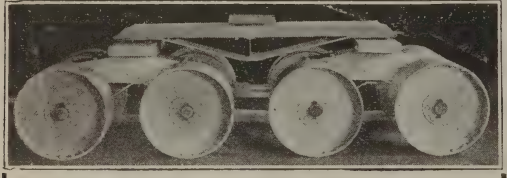
—with or against the grain—than the most skillful man can ever do by hand. Scrapes forward or backward. Any one can operate it without previous experience—and it does just as excellent work close to the baseboard as in the middle of the floor. Has all latest attachments—including one of the best Sharpening Devices ever invented.

Try It Five Days Free

Prove what we say. Send for one. Try it on your toughest job for five days. If its work isn't the best you ever saw, return it at our expense. That's a safe way to find out, isn't it? Don't wait—write today.

JOHN F. WEBER, President
WEBER MANUFACTURING CO.
661 71st Ave., WEST ALLIS, WIS.

Move the Old House to Another Lot
Instead of Wrecking It
You Can Make More Money by Doing So



THE LA PLANT HEAVY HOUSE MOVING TRUCKS ARE MADE OF STEEL

On scientific lines—are interchangeable so they can be worked singly, in pairs or in fours.

WRITE FOR CATALOG N

and see how easy it is to wheel a building a mile in a day—and how little the cost is for La Plant outfit compared with the profit to be made in moving houses instead of wrecking them.

LA PLANT TOOL CO.
900 E. Nevada St., Marshalltown, Iowa

THE Fox Floor Scraper
A $25 FLOOR SCRAPER

Guaranteed to do perfect work. Simple of construction. Easy to operate. Leaves a smooth finish. Shipped on five days' free trial, freight charges prepaid.

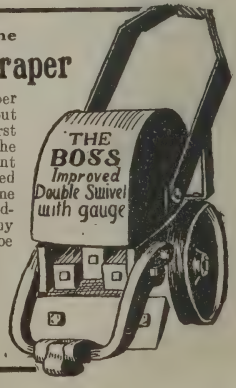
Price, $25.00

FOX SUPPLY CO.
10 E. Main Street BROOKLYN WIS.

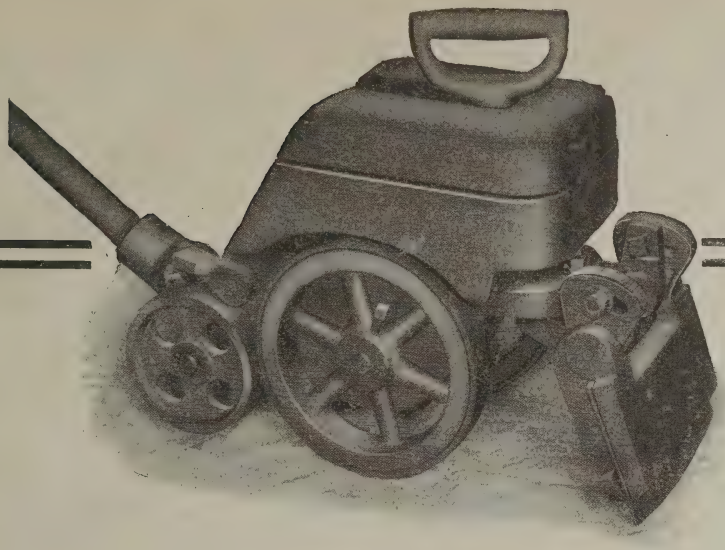
It Works Like a Plane

The Boss Floor Scraper

The Boss is the only Floor Scraper made that will plane a floor without leaving a square cut where knife first starts cutting. WHY? Because the Boss is made with a gauge on front to which is attached a pear shaped wheel which raises when the machine is pulled and lets the knife down gradually. ¶ The Boss can be set for any thickness of shaving. It also can be set for any shearing cut, right or left, up or down, to suit the kind of lumber. ¶ It is guaranteed to give absolute satisfaction.



G. J. KEPPLINGER
Main Office, Dwight, Ill.
Manufactured also in Canada.



The Adjustability of the Triple "A" Spring Driven Floor Smoother—

—is particularly striking in the SCRAPER HEAD, which can be adjusted:—
- —for the reversible shear cut
- —up and down to fit every angle that a scraper edge may be turned to.
- —to scrape corners and close to base-boards
- —to use entire edge without re-sharpening
- —for easy re-sharpening and without removing the blade
- —for sandpapering attachment

—and in the OPERATING HANDLE, which can be adjusted:—
- —to an easy working position accord- to height of the operator
- —for use in very small rooms or halls

—and in the WEIGHTS, which can be adjusted:—
- —to conform with any size scraper edge required
- —for light or heavy cutting
- —to prevent waves on all kinds of work
- —to accomplish the work in a most practical way.

But adjustability is only **one** feature of the Triple "A" Floor Smoother! The remarkable adaptability and efficiency are other points of supremacy, and represent substantial reasons why the Triple "A" is the only really practical surfacer for all-around work.

Begin **easier** and **better** scraping today! We have shown how thoroughly the machine does the work—now let the machine itself explain how its SPRING DRIVE will relieve you, or the operator, of all the heavy work—of the "back-straining" and "arm-wrenching" effects usually resulting from the use of ordinary scrapers.

We'll prove our claim that every contractor needs this machine, by sending it on a week's trial on a saving-effected-or-no-pay basis. Send us the word today and a machine leaves for your job immediately.

Triple "A" Machine Co.

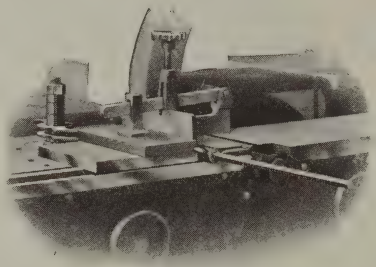
28 North Clark Street CHICAGO

The No. 51 Crescent

WILL INCREASE YOUR PROFITS

It Will Cut Down Your Cost, Save Delays, and Enable You to Do More Work and Better Work This Season than You Have Ever Done Before

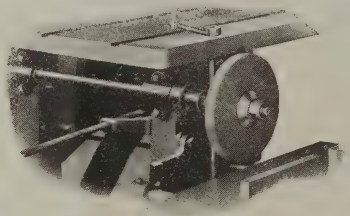
If you could just see this machine in operation and see how easily it does its work, if we could just get you to understand how convenient the machine is and how well adapted it is for just the kind of work you have to do, we would not have to ask you a second time to place your order. You would buy the machine without urging.



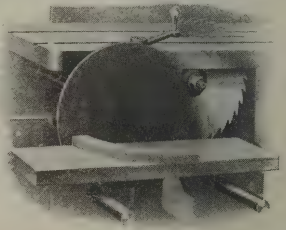
A tenoner attachment can be furnished at very low price and will soon pay for itself on many kinds of work.

A knife grinder can be furn as an extra and is very conv for grinding planer knives.

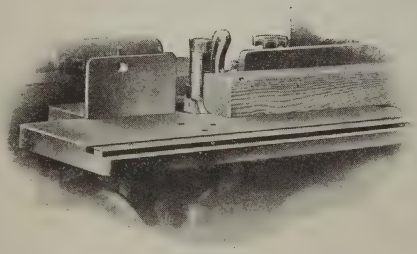
See how the jointer and shaper can be used to straighten one side and one edge of a piece at the same time. Pressure springs hold the work in place. This is a regular feature of the No. 51 CRESCENT Universal Woodworker.



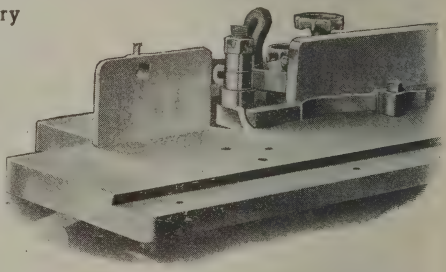
An emery wheel may be attached to the borer spindle and is very convenient for grinding tools.



This is a good view of the disk grinder. The disk is 14 inches in diameter. Table can be raised and lowered to suit the work being done.



Poles and shafts can easily be rounded on the shaper spindle. This feature will appeal to the wagon and carriage builder. All you need to do this work is the special knives.



It is a very easy matter to work quarter round or moulding on the shaper spindle. The pressure spring holds the work securely up against the fence.

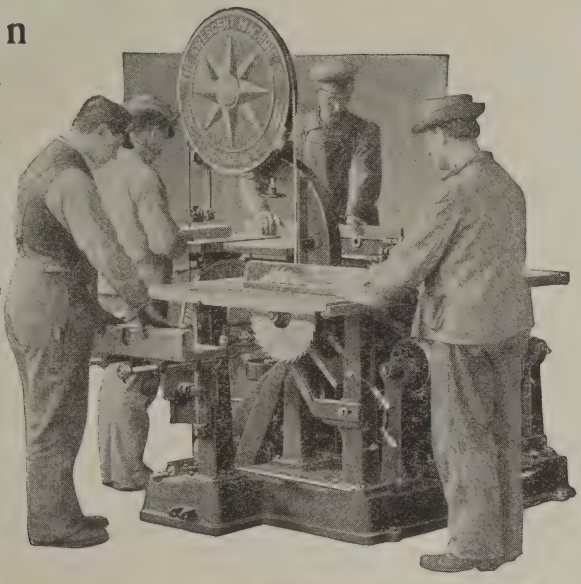
THE CRESCENT

10 Main Street

Universal Woodworker

Your Men

work on the 51 CRESENT Universal lworker without ntefering wfth other. Each ıine may be edand stopped ependent of ɔther and each man controls wn work.



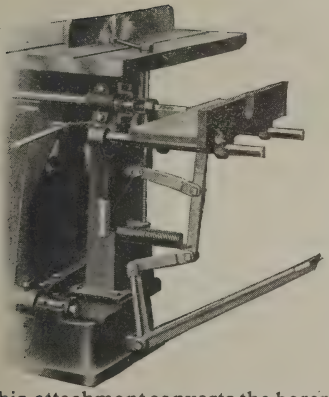
Ask Today for

Our Special Catalog No. 51

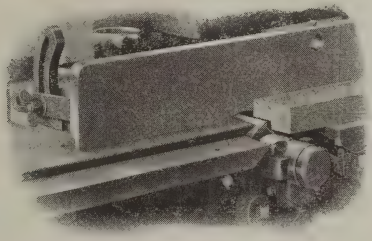
It Tells All Abou This Splendid Tool. At the Same Time We Will Send

Our 1912 Catalog o Band Saws

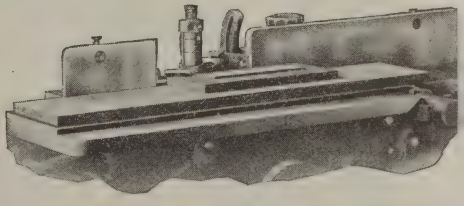
Saw Tables, Jointers, Shapers Planers, Disk Grinders, Swing Saws, Planers and Matchers, Variety Woodworkers an Borers.



This attachment converts the borer into a hollow chisel mortiser, suitable for cutting mortises up to $\frac{5}{8}$ inch square.



This shows how to do rabbeting on the jointer. You can't do it on every jointer but you can on a CRESCENT. The operation is fully explained in the special circular of the No. 51 Universal woodworker.



A panel raising attachment can be supplied at a slight additional charge. This is a desirable feature for many classes of work.

MACHINE CO.

Leetonia, Ohio, U.S.A.

MORE
C.H.&E.
PORTABLE SAW RIGS NOW IN USE than all of our IMITATORS COMBINED

We are the Pioneers in the manufacture of

PORTABLE SAW RIGS

We Manufacture them in Four Sizes

Write for our Descriptive Catalogue

C. H. & E. Manufacturing Co., Inc.

319 Mineral St., Milwaukee, Wis.

Barnes Hand and Foot Power Machinery

COMPLETE OUTFIT FOR

Carpenters and Builders

Improved Former has an adjustable table. Knives can be instantly reversed to suit the grain of wood. Speed of knife is 2,500 per minute, thus insuring smooth work.

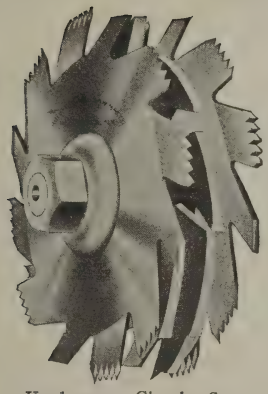
Improved No. 7 Scroll Saw

Warranted to be well made; will saw pine three inches thick at the rate of one foot per minute. Other woods in same proportion according to hardness. Price, $15.00.

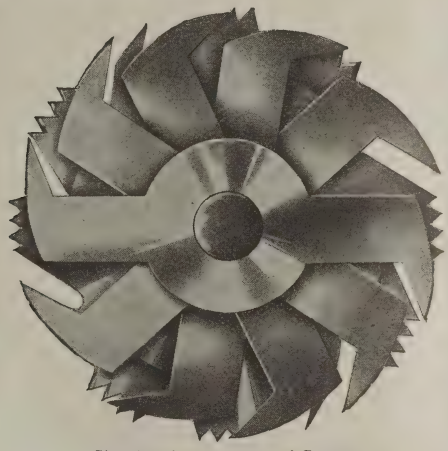
We make Sixty Styles of Knives
SEND FOR NEW CATALOG

W. F. & JOHN BARNES CO.
436 RUBY STREET ROCKFORD, ILL.

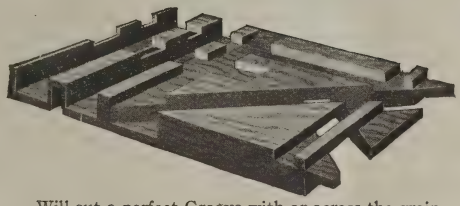
HUTHER BROS. PATENT GROOVER OR DADO HEAD



Used on any Circular Saw Mandrel



Showing Arrangement of Cutters



Will cut a perfect Groove with or across the grain

A few Reasons why every woodworking plant should have a Huther Bros. Patent Dado Head

1. They do perfect work.
2. Ease of operation.
3. Simplest of all heads to adjust.
4. Will pay for itself in a few days.
5. Sent on 10 days' approval and can be returned at our expense if not satisfactory.

Consider the last two reasons and order one of these tools. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Band Saws, Scraper Blades, etc.

WRITE FOR OUR WOODWORKERS' CATALOG No. 32

Huther Bros. Saw Mfg. Co.

2500 University Ave. **Rochester, N. Y.**

THE STANDARD PORTABLE COMBINATION WOODWORKER

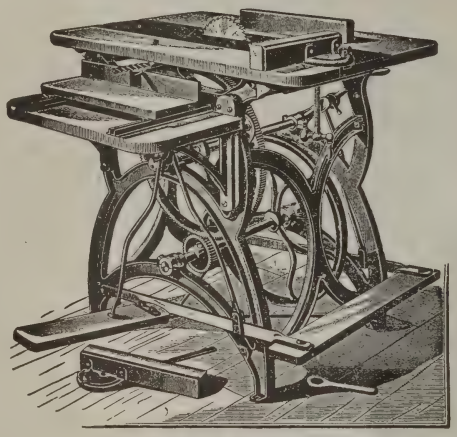
NINE MACHINES IN ONE EQUIPPED WITH 6 H. P. ENGINE

SEND FOR ILLUSTRATED CATALOGUE

ATLANTIC ENGINE COMPANY, Inc.

MERCER STREET - - - - MEADVILLE, PA.

CANADIAN OFFICE, BRIDGEBURG, ONT.



MARSTON'S

Hand and Foot Power Circular Saw

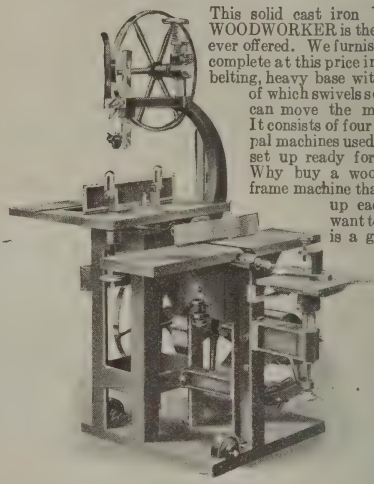
Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

Send for Catalog

J. M. MARSTON & CO. 193 Ruggles Street BOSTON, - MASS.

$125.00 Buys Four Machines

- A Band Saw
- A Saw Bench
- An 8″ Jointer & Plane
- A Mortiser and Borer



This solid cast iron UNIVERSAL WOODWORKER is the biggest value ever offered. We furnish the machine complete at this price including tools, belting, heavy base with wheels, one of which swivels so that a man can move the machine easily. It consists of four of the principal machines used in a mill, all set up ready for instant use. Why buy a wooden or angle frame machine that must be set up each time you want to use it? Here is a guaranteed superior machine for one-third to one-half the price others ask. It is a better value in every way. We guarantee it absolutely and will refund your money if you are not perfectly satisfied. You should see our illustrated literature on this wonderful proposition before you buy a WOODWORKER.

Write To-day.

THE TANNEWITZ WORKS

317 NORTH FRONT STREET

GRAND RAPIDS - - MICHIGAN

PARKS' WOODWORKING MACHINES

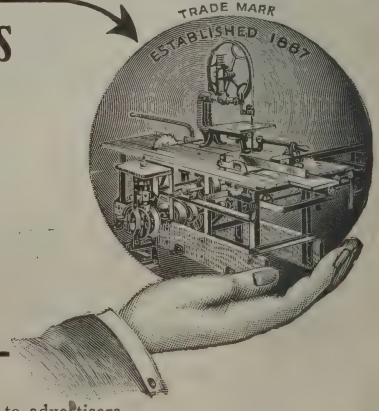
Circular Saw, Jointer, Moulder, Band Saw, Shaper, Swing Cut-Off Saw, Groover and Boring Machine—all set ready for use.

It is Parks who for twenty-five years has been putting out the most practical combinations—convenient in operation and most effective in use—in large quantities—at a price you can afford to pay.

Ask for Catalogs and see the many designs of Foot, Hand and Belt Power—also our Portable outfit.

THE PARKS BALL BEARING MACHINE CO.

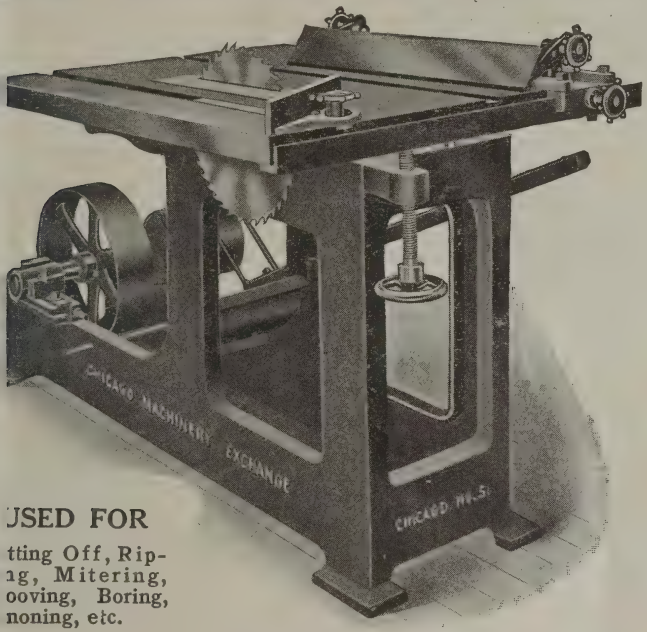
Knowlton and Fergus Streets, Cincinnati, Ohio, U. S. A.



These Two Machines for $170

Are the Best "Buy" You Can Find Anywhere

They Are Always Ready for Work Without Any Changing and will stand the hardest kind of usage without getting out of order.



This low price of $170.00 includes belt for saw arbor, countershafts, one 12 in. rip saw, one 12 in. cut-off saw, five boring bits—¼ in., 5/16 in., ⅜ in., ½ in., ¾ in.—and one pair of jointer knives.

USED FOR

Cutting Off, Ripping, Mitering, Grooving, Boring, Planing, etc.

Ask for Price on One if You Cannot Use Both

MACHINE No. 1
Chicago No. 5 Combination Saw Table

Read What Contractors Think of Our Machines.

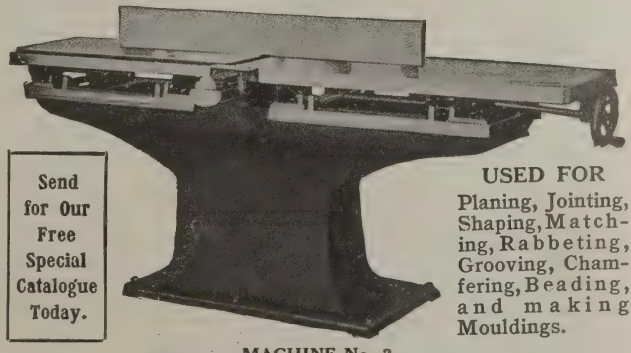
Charleston, Ill., July 13th, 1911.
Chicago Machinery Exchange,
Chicago.

Dear Sirs:

Your saw table which I bought of you last fall is a complete success, the best I ever saw for the money, and I have worked in a good mill for ten years. You can refer anybody to me in regard to your saw table No. 5.

Yours,
CLARENCE B. MUCHMORE

We issue a Catalogue of Machines Especially Adapted for Contractors' and Builders' Use.



Send for Our Free Special Catalogue Today.

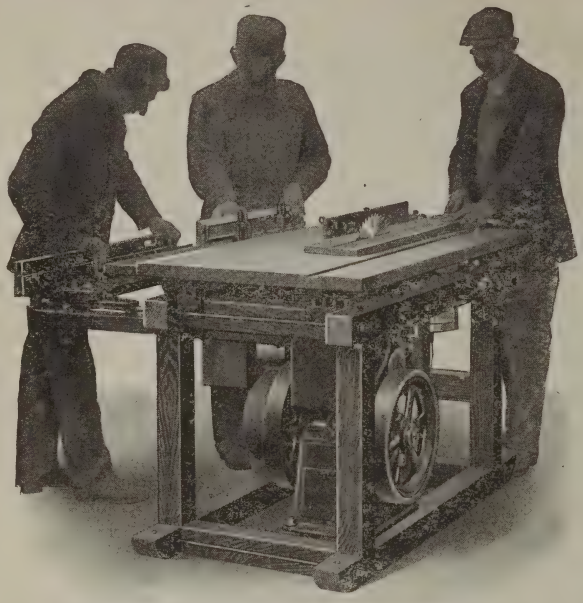
USED FOR

Planing, Jointing, Shaping, Matching, Rabbeting, Grooving, Chamfering, Beading, and making Mouldings.

MACHINE No. 2
Chicago 12-Inch Jointer and Planer

Chicago Machinery Exchange

1217 to 1225 W. Washington Blvd. Chicago, Ill.



"AMERICAN"

Contractors' Portable

VARIETY WOOD-WORKER

A complete saw bench—a planer and moulder—a boring machine—bought separately would cost more than the average contractor wants to pay.

But in the "American" Wood-Worker you get these three machines in one, so combined that three men can work at them at once without interference—and all at a very moderate price.

There's no lost time if you have an "AMERICAN"—no men standing around for a chance at the machine.

This three-man feature triples the earning power of your investment in an "AMERICAN" Wood-Worker.

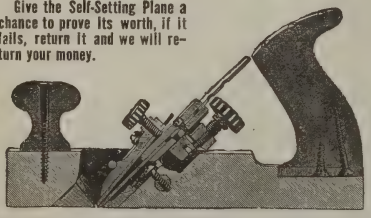
AMERICAN SAW MILL MACHINERY CO.

BUILDER OF SAW MILLS AND WOOD-WORKING MACHINERY

80 Laight Street, HACKETTSTOWN, N. J. **1650 Hudson Terminal, NEW YORK CITY**

INTRODUCTORY TRIAL OFFER

Give the Self-Setting Plane a chance to prove its worth, if it fails, return it and we will return your money.



If the SELF-SETTING PLANES are not sold in your town and you write us saying, "I saw your trial offer in N. B.", we will send you particulars, a carpenter's pencil and our $1.00 CERTIFICATE, which we will receive as $1.00 in part payment for a SELF-SETTING PLANE, as stated in our $1.00 CERTIFICATE, and if this S. S. PLANE is unsatisfactory and returned at our expense, we will send you $1.00 more than you sent us, as the $1.00 CERTIFICATE says.

As this paper guarantees we will do as our advertisment says, you know the plane must be O. K.

ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained eaty, knurly, knotty, hard or soft wood you can find, THAT IS FREE FROM SAND OR DIRT.

If it is not worth to YOU or YOUR MEN, TWICE ITS COST, return it at our expense, as above stated.

If you send us the addresses of ten carpenters, no matter where they live, we will send you another carpenter's pencil, hard and tough.

Carpenter's Hard, Tough Pencils, 30c per dozen, postage prepaid.

GAGE TOOL COMPANY, Vineland, N. J.

If It Is

Wood Working Machinery

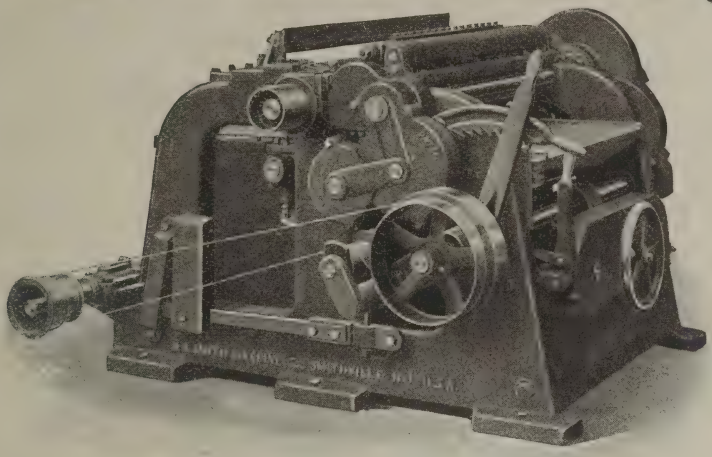
Consult Us

United Machinery Company

88-89 CENTER ST. **NEW YORK**

SMITH OF SMITHVILLE

Woodworking Machinery



This cut represents a Heavy Cabinet Planer which is adapted for Hardwood Mills and for making Interior Finish. It is fitted with a 4-knife Round Head, and provision is made for jointing and grinding the knives without removing the knives or head from machine.

For further particulars address

H. B. Smith Machine Co.

Smithville, N. J.
U. S. A.

BRANCHES: New York
Chicago
Atlanta
San Francisco

"Diamond" Mortiser

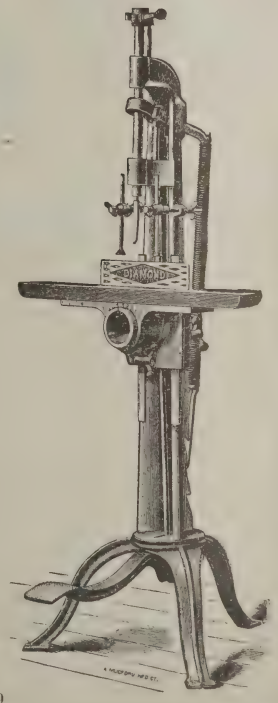
FOR FOOT POWER

Will mortise ⅛ to 1 inch wide, 3 inches deep or 6 inches deep by reversing the work, and with our patent adjustable tenoning tool will cut tenons ⅛ to 1 inch wide. Has rigid iron column, powerful foot motion and accurate action. The table has horizontal, vertical and angle adjustments.

It takes up but little space, is light and can be easily moved about to accommodate your work.

We make a complete line of Foot, Hand and Light Power Wood-working Machinery suitable for Carpenters, Builders, Cabinet Workers and other Woodworkers. It will pay you to investigate their merits.

Send for Catalog "A."



The Seneca Falls Mfg. Co.
629 WATER STREET
Seneca Falls, N. Y., U. S. A.

299

Think of the things you could do with this rig!

Think of the Things You Could Do With This Rig!

It's a whole planing mill in itself. Saws your hardest lumber (rip or cross-cut) as true and clean as a die—bores—jig-saws—does all the things shown here, and more too, at a fuel cost of only **2 cents an hour.** Two men can load it into a light wagon and take it right out onto the job. Once there you can skid it anywhere—upstairs or down. Costs very little and soon makes that up in profits for the **smallest carpenter.** The

TRADE OSHKOSH MARK

Eveready Saw Rig

"Guaranteed for Life"

has frame, table and skids of selected rock maple, air and kiln seasoned—positively guaranteed to remain true. Contains a fine 4 h. p. gasoline engine of latest improved type. Any of your men can easily operate it. Just a whirl of the wheel and the work's under way. And it's **actually guaranteed for life.** You needn't worry a bit about what will happen to it after the guarantee period. There **is** no guarantee period—we are back of it once and always.

OSHKOSH MFG. CO.

414 S. Main St. **OSHKOSH, WIS.**

Successor to Oshkosh Logging Tool Co.

All These Attachments Absolutely FREE with the Oshkosh Eveready Saw Rig

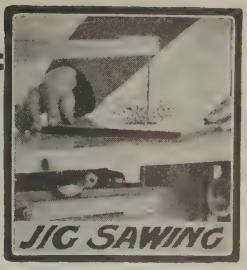
Jointer Head—This works on exactly the same principle as an up-to-date planer. Produces a smooth, even job, with no deep cut as the material leaves the jointer head. 2½ inches in size.

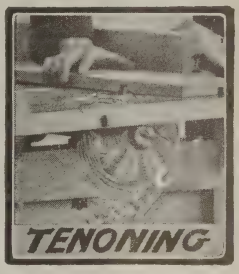
Boring Attachment—A high-class attachment. Guaranteed absolutely accurate. Extra long boxes insure easy, long running qualities on the guides. Bits, standard size.

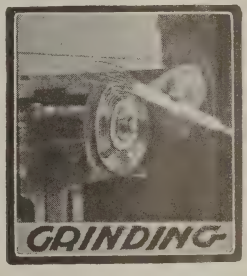
Jig Saw—Not a cheap one, but the best 12-inch jig we can make. All joints reinforced with steel, equipped with brass bushings. Once use it and you won't part with it.

Sander—The best one yet—a great time and money saver over old methods in change and economy of paper. Our methods of holding paper will not blister as do many others. 10 inches in diameter.

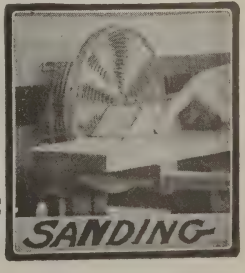
Saw Gauge and Miter Device—Saw gauge of the best gray iron, 18 inches long, adjustable to any bevel. Miter device adjustable to any angle and can be used as a cross-cut gauge.







Eveready TRADE MARK **OSHKOSH** *Saw Rig*



Dado Head—Our own special design. Does smooth, even work with or across the grain. Makes window frames, dados, etc.

Emery Wheel—A 6-inch wheel made for grinding tools is also furnished with this rig.

Try the "Eveready" Six Days FREE

Then—If You Can Get Along Without It, Return It at Our Expense

The trial won't cost you a cent if you can't find **paying** use for the rig. You've always wanted a good rig for your shop. Here's a safe chance to get the right one. Spring is a fine time to break it in—because everybody will be after screen doors and windows and the hundred other little spring jobs that are always in a rush, and pay well if gotten out in a rush. **Send for free trial offer,** prices and detailed description of the rig and all its free attachments.

OSHKOSH MFG. CO.

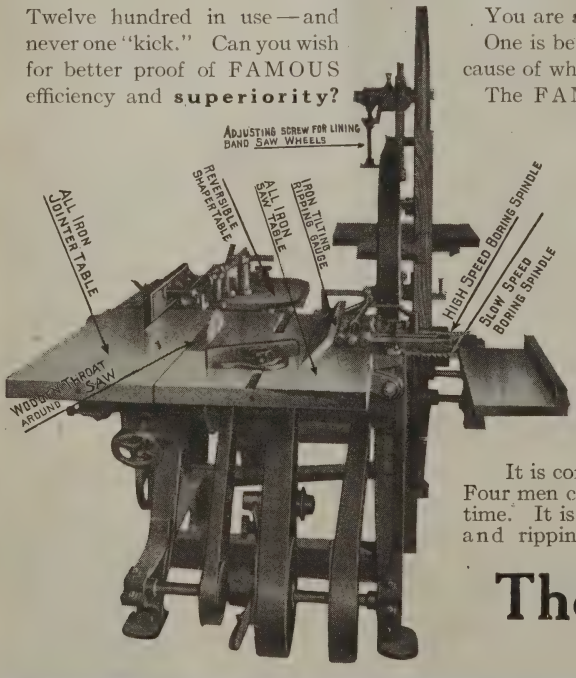
414 S. Main St. **OSHKOSH, WIS.**

Successor to Oshkosh Logging Tool Co.

1200 FAMOUS in use today
The Original and Reliable

TWELVE Hundred Carpenters, Contractors and Builders have adopted the FAMOUS way of getting out millwork—they have stopped paying out money to local planing mills or installing a number of machines—and let the FAMOUS Universal Woodworker do the work

Twelve hundred in use—and never one "kick." Can you wish for better proof of FAMOUS efficiency and **superiority?**


ADJUSTING SCREW FOR LINING BAND SAW WHEELS
ALL IRON JOINTER TABLE
REVERSIBLE SHAPER TABLE
ALL IRON SAW TABLE
IRON TILTING RIPPING GAUGE
HIGH SPEED BORING SPINDLE
SLOW SPEED BORING SPINDLE
WOODS THROAT AROUND SAW

You are **safe** in buying a FAMOUS for **two** reasons. One is because of the **machine itself**—the other is because of what **actual users say** about it.

The FAMOUS is the largest in **sales,** largest in **experience** and the largest in **demand.**

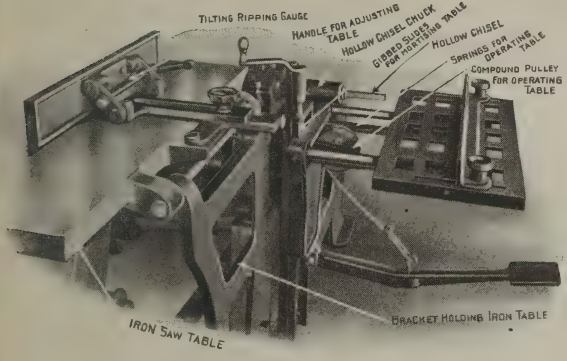
Don't forget that "imitation" woodworkers are experiments—which the buyers pay for.

When you buy a FAMOUS Universal Woodworker you have a complete planing mill for **one investment.** You can do practically all your own millwork because the FAMOUS does **sixteen** different kinds of work.

It is compact, easily operated and guaranteed for life. Four men can operate four different attachments at one time. It is of all-metal construction, with iron saw-table and ripping gauge, and is practically indestructible.

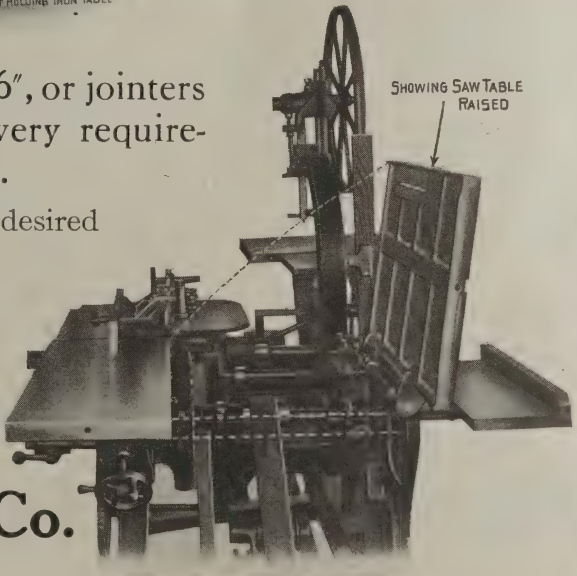
The Sidney Tool Co.
SIDNEY, OHIO

Universal Woodworkers and giving satisfaction — avoid imitations



THE FAMOUS is furnished in different styles and sizes, and we are prepared to furnish any particular design desired. For instance, we can supply them with any size band saws from 20″ to 36″, or jointers from 8″ to 16″, etc. Your every requirement is satisfied—absolutely.

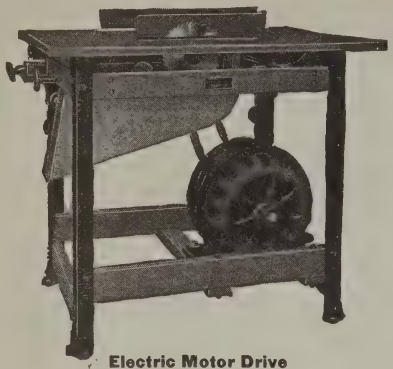
Stationary or portable Types as desired



For your business's sake buy a wookworker—and buy a FAMOUS to avoid disappointments. Investigate the matter closely—send for FAMOUS literature and get evidence from FAMOUS users. Mail us a postcard today for complete information—**and don't wait any longer.**

The Sidney Tool Co.

SIDNEY, OHIO



Electric Motor Drive

"GRIMM" WOODWORKER

You Need This Machine

It will do all your woodworking.

Think of the saving it will make in time and money.

Can be used for ripping, cutting off, sizing, jointing, planing, plowing, jig-sawing, boring, moulding, shaping, rabbeting, mitering, mortising, tenoning, sanding, and emery wheels.

Built to operate with electric motor or belt drive, also gasoline engine for portable use.

There are thousands in use giving complete satisfaction.

Send for Catalogue and Prices

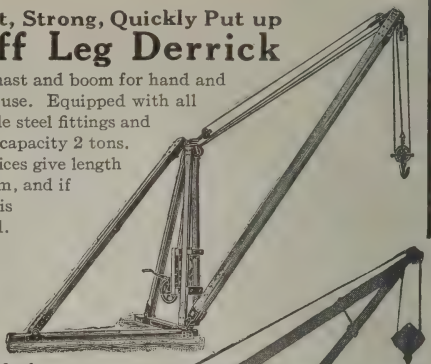
GRIMM MFG. COMPANY

42 Erie Street, BUFFALO, N. Y.

Light, Strong, Quickly Put up

Stiff Leg Derrick

split mast and boom for hand and power use. Equipped with all crucible steel fittings and gears, capacity 2 tons. For prices give length of boom, and if winch is desired.



Sasgen Circle Swing Reinforced

Builders Derrick

$45.00

complete ready for use with geared winch, 150 ft. 5-16" cable, block fasteners, etc., capacity 2500 lbs.

Our Motto: Satisfaction or no Sale.

Write for Catalog "N"

SASGEN BROS. 2053-57 Racine Ave., **CHICAGO**

New York Office, 103 Park Ave.

Taylor Portable Steel Derrick

Tested at factory, hoisted and swung complete circle 1900 lbs. Shipped ready to operate. No wrench or tools required to set derrick on job. Made in two sections. Beam section connects post by tipping in a vertical position and projects at such an angle to clear side wall of building and has sufficient height to hoist wheelbarrows, window frames and timbers. One man can climb a ladder with either section. Consider the durability of a derrick constructed entirely of malleable Iron and Steel and that of wood, more compact, more powerful.

Derrick complete with three way blocks, channel steel brackets, bolts for attaching to building, price $40.00, and four and one-half cents per ft. for crucible steel cable attached. Drum capacity 300 ft.

Special platform and chains for attaching derrick to gondola railroad cars, price $15. Chains for hoisting wheel-barrows, price $2.00.

JOHN L. TAYLOR, Manufacturer

Taylor Portable Steel Derricks

Telephone Monroe 3066 **1934 W. Lake St., Chicago**

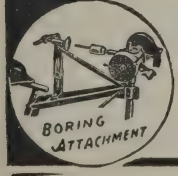
30 Days Free Trial

Sharpen your knives, twist drills, gum your saws—put all your tools in perfect shape—use this complete outfit 30 days free—then, if you feel it doesn't save you lots of time, work and money, send it back at my expense.

Dimo-Grit wheels, "the wheels for steel," 25 times faster than grindstone, 10 times more efficient than emery wheels—will not draw temper.

Dimo-Grit is the new artificial diamond sharpening substance. It is a product of the same electrical processes by which carborundum is made, but Dimo-Grit is especially adapted for use on steel, leaving the smoothest, keenest edge. No need of water cooling, no danger of drawing temper. Dimo-Grit never glazes—cuts hardest steel as emery does soft copper—just a light touch needed.

Luther "Hummer" Tool Grinder



A Workshop in Itself

Extra attachments convert the Luther "Hummer" Tool Grinder into jig and circle saw, lathe, force feed drill, etc.—you can completely equip your workshop at very low cost—free book illustrates and describes extra attachments—16 in all. Write for Free Book today.

Dimo-Grit Sharpening Stones

Ask your dealer for Dimo-Grit sharpening stones—the fastest, smoothest sharpening substance for steel. Look for the name "Dimo-Grit" on the stones.

Engine and foot power—4000 revolutions per minute by foot power. Shaft drive like an automobile—built completely of steel—dust-proof ball bearings—gravity lubrication and runs easy as sewing machine. Tool rests and attachments enable anyone to do difficult grinding as well as an expert mechanic.

40 Page Book Free

Reprints the story of artificial diamond sharpening substances as it appeared in McClure's Magazine—fully describes the Luther sharpening outfits—contains valuable pointers on tool sharpening—sent free.

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719 Michigan St., Milwaukee, Wis.

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THE BIG LINE OF

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Northwestern prices are from 15% to 50% lower than on any other standard line of concrete machinery, tools and appliances. Everything guaranteed. No money down —10 days' trial. Low prices are the result of big facilities and manufacturing economics. No matter what you need for any kind of CONCRETE WORK, you will find it in the NORTHWESTERN LINE, at a money-saving price.

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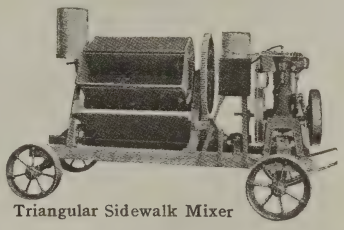


Triangular Sidewalk Mixer

Northwestern Steel and Iron Works

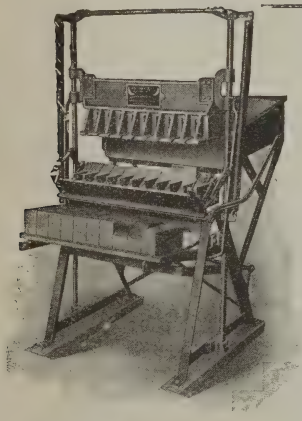
1079 Spring Street *EAU CLAIRE, WISCONSIN*

Wholesale Prices

Block Machines, $10 to $250; Brick Machines, $22 to $75; Mixers, $24 to $1000; Porch Column and Baluster Outfits, $15 to $75; Cap and Sill Moulds, $12 to $35; Lawn Vases, $15 to $25; Ball Moulds, $2 to $17; Grave Stone Moulds, $7 to $69; Well Curbing Moulds, $4 to $7; Drain and Sewer Tile Moulds, $6 to $83; Block Cars, $11 to $17; Fence Post Moulds, $7 to $12; Silo Moulds, $14 to $150; Coping Moulds, $18; Hitching Post Moulds, $20; Baluster Moulds, $6 to $18; Jardinieres, $12; Special Gate Post Moulds, $10 to $30; Newel Post Moulds, $14; Grave Markers, $7; Burial Vaults, $90.

Complete line of Cinder Crushers, Rock Crushers, Sand and Gravel Elevators, Sand Screens in both Revolving and Stationary type, Mortar Gauges, Wheelbarrows, Jointers, Groovers, Edgers, Corner Tools, Curb and Gutter Tools, Corrugating and Radius Tools, Roller Jointers, Brick Tongs, Curb Clamps, Curbing Edgers, Hawks, Floats, Line and Indentation Rollers, Tampers, Rammers, Name Stamps, Indentation Letters, Wall Plugs, Expanded Metal and Water Proofing, Flower Pots, Etc.

Write telling us what you are interested in so we can send you full information



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It will pay you to act at once.

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On Concrete Machinery

It isn't exactly a catalogue, because it gives you the cost of making concrete Blocks, Bricks, Porches and Chimneys. It tells all about the profits in making Drain Tile for Farmers, the advantage of drainage, etc.

BUILDING BLOCKS
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CHIMNEYS
DRAIN TILE
SEWER PIPE
SILO BLOCKS
AND OTHERS

You ought to have this book if you are interested in concrete. Sixty-four pages of illustrations and interesting reading. Send at once, today, a postal will do.

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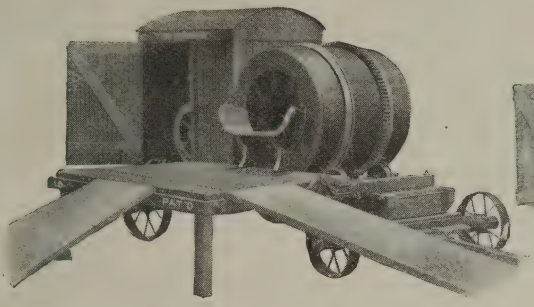
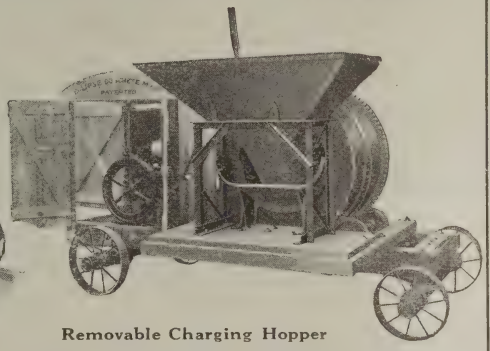


With Folding Platform



Removable Charging Hopper

In addition to our regular low charging mixers, we also have special designs for peculiar requirements, such as:

"THE STANDARD" Low Charging Mixer with Folding Platform.
(Shown in Illustration Platform down in mixing position.)

"THE STANDARD" Low Charging Mixer with belt drive.

"THE STANDARD" Low Charging Mixer with cart charging arrangement.

"THE STANDARD" Low Charging Mixer with removable Charging Hopper.

"THE STANDARD" Hoists and Elevators.

Gas and Gasoline Engines.

"THE STANDARD" Low Charging Mixer with discharging trough for street work.

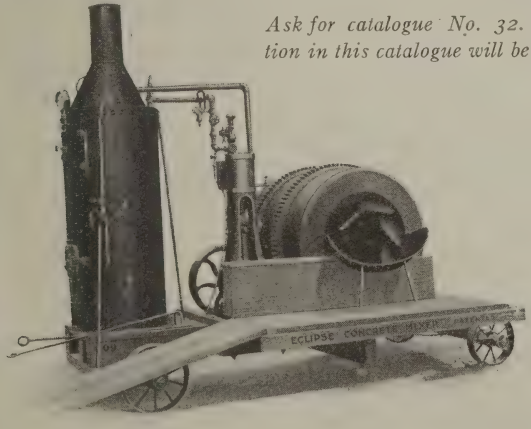
"THE STANDARD" Low Charging Mixture with hoist for mixed concrete.

The Eclipse Stone or Block Machine.

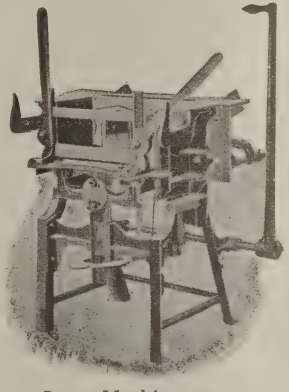
The Perfect Brick Machine.

Steam Engines and Boilers.

Ask for catalogue No. 32. The information in this catalogue will be of value to you.



Steam Outfit

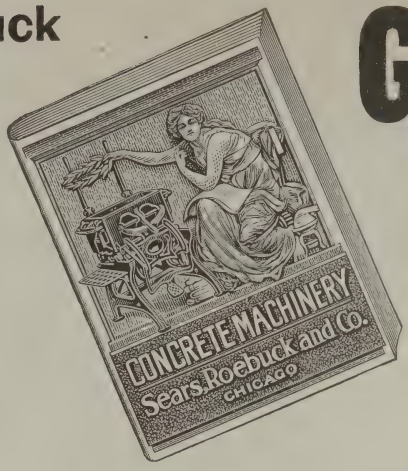


Stone Machine

The Standard Scale and Supply Co.

CHICAGO, 1345-1347 Wabash Ave.
PHILADELPHIA, 35 South Fourth St.
PITTSBURGH, 243-245 Water St.
NEW YORK, 136 West Broadway

Sears, Roebuck and Co.'s Big 1912 Concrete Machinery Catalog



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Our Big, New 1912 Concrete Machinery Catalog No. 83N95 is just off the press, and displays the largest and most complete line of high grade concrete machinery ever assembled. We want every builder, contractor and, in fact, every reader of the National Builder to send for a copy of this big book. We will gladly forward it to you, free and postpaid. Simply send your name and address.

Our prices on concrete machinery are EVEN LOWER this year than ever before, and we have always quoted the lowest prices of any concern on this line of machinery. We take the entire output of the world's largest concrete machinery factory, and our enormous direct-to-the-consumer business enables us to quote surprisingly low figures on the very best quality of machinery.

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Everything shipped direct from the factory, and with the distinct understanding that you are to be perfectly satisfied in every respect, as to price, quality of material and efficiency. In case you are not more than pleased with your purchase, you can return the machinery to us at our expense, and your money will be returned to you, together with any freight charges you may have paid. We make this sweeping unconditional guarantee because we know we are handling the most durable, perfect running concrete machinery on the market today.

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Sears, Roebuck and Co., Chicago, Ill.

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Accuracy, Convenience and Economy are the Features Secured by Using

U. S. Standard Concrete Mixers

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NO TANK
NO FAN
NO FREEZING TROUBLE

Cut Down Operating Expenses

Novo Hoisting and Pumping Outfits will enable any contractor to cut down his power costs to a minimum. The

NOVO ENGINE

"The Engine for Every Purpose"

gives power cheaper than either steam or electricity. It eliminates the licensed engineer, expensive wiring, electric current and coal; occupies a minimum of space. The Novo is simple, reliable, very readily portable—the lightest engine for power developed.

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and investigate for yourself. Ask us to prove our claims.

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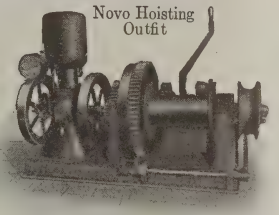
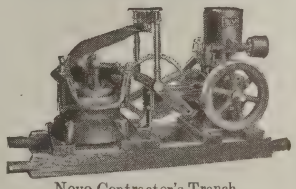
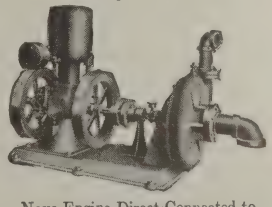
Clarence E. Bement, Sec'y and Gen'l Mgr.
228 Willow Street, Lansing, Mich.

We can offer an exceptional dealer's proposition in new territory. Write us for facts and figures.


Novo Hoisting Outfit


Novo Contractor's Trench Pump Outfit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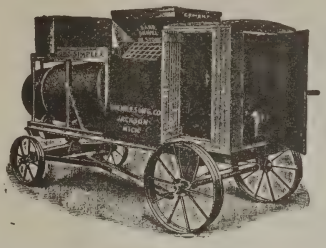
THE SIMPLEX
IMPROVED MIXER
1912 MODEL



Three Hoppers, continuous feed, rolling mix, low down steel frame, simple, strong and accurate

"THE MILES"
No. 5, DOWN FACE WET CONCRETE BLOCK MACHINE

Makes Stone in Lengths 4, 6, 8, 10, 12, 16, 18, 20, 22, 24 inches. In Widths 4, 6, 8, 10, 12 inches. In Height 4, 6, 8 inches.

Also Angle Stone, Circle Stone, Gable Stone, Hollow or Solid Stone. Simple, Strong and Rapid. Lowest in price. WRITE FOR NEW 1912 CATALOGUE.

The Contractor's Friend

THE MILES MFG., CO., Inc,
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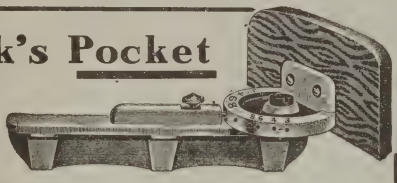
Milk's Pocket



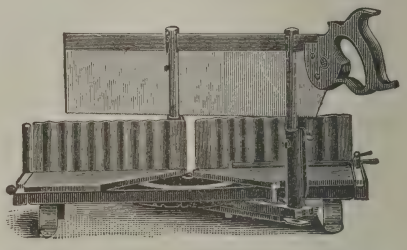
Miter Box
Of Aluminum

Cannot break *Guaranteed accurate*
Requires no bench

Always with you, in the pocket. Make cut while holding moulding. No extra saw to pay for, use any fine saw you have. Ask your dealer, if you cannot get it, send $1.00 for it on one week's trial.

Satisfaction or your money back

The Parsons Tool Mfg. Co.
2030 Corning
PARSONS : KANSAS : U. S. A.



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Made of STEEL—Cannot Break

First in Quality and Improvements

Automatic Stops for Holding up saw.
Corrugated Backs. Graduated Gauge for Duplicate Cuts and many other features.

If You Want the Best You Will Take No Other

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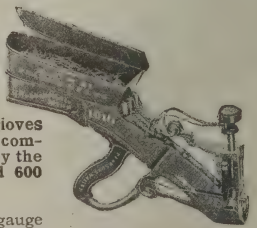
GOODELL MFG. CO.
Greenfield, Mass.

PEARSON'S AUTOMATIC SHINGLE NAILER

Pays For Itself on One Fair-sized Shingling Job

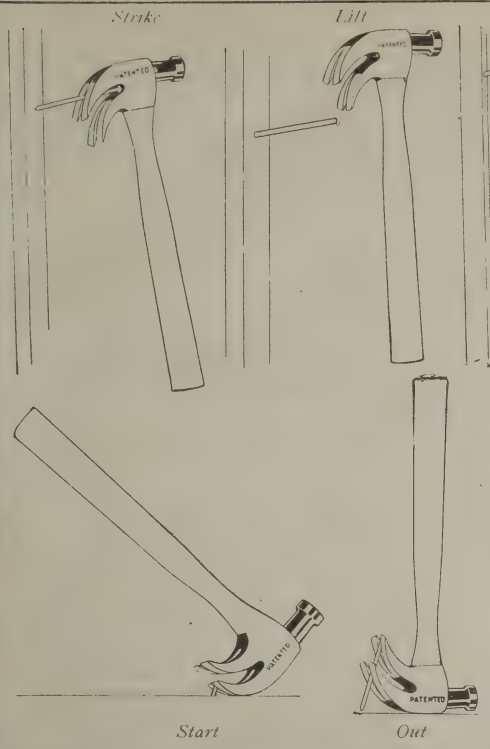


Works well on roofs of any pitch. You can wear gloves or mittens and drive nails faster and with more comfort than the old way. Just throw the nails in by the handful (Nailer holds easily between 500 and 600 nails in the top), and start nailing.

PEARSON NAILERS are made in two sizes.

The Blue Nailer is for common 3d, No. 14 gauge wire nails, and the Red Nailer is for the **galvanized** 3d. No. 13, 1¼ in. wire nails. Order from your dealer or send **$5.00** for either one—express prepaid. Money cheerfully refunded if Nailer is not as represented. *Write for Circular "N"*

PEARSON MFG. CO. ROBBINSDALE, MINN.



The

Double Claw Hammer

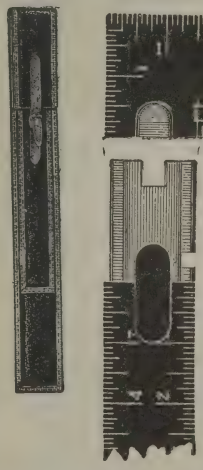
No strain when high nailing.
Pulls the nail out straight without a block.
16 oz. head / 21 oz. head } WHICH?
Both same price, $1.50.

The Double Claw Hammer has all the good features of the old kind and a lot more besides.

It is cheaper at $1.50 than the common hammer because it costs three times as much to make and will do many times more for you.

Ask your dealer or send $1.50 and we will pay express charges.

Double Claw Hammer Co
453 Broadway, BROOKLYN, N. Y.



AT LAST

Pat. Nov. 7, 1911

A TAKE-DOWN SQUARE THAT WILL REMAIN TRUE.

Backed up by the manufacturer and sold with the privilege of returning if it does not prove satisfactory. These are manufactured containing the famous Nicholls Rafter Framing Rule giving you the lengths and cuts for common, hip, valley and jack rafters for seventeen different pitches of roof.

IT WILL COST YOU NOTHING TO LEARN THIS RULE.

BE A FIRST CLASS CARPENTER **Send in Coupon →** **FREE**

THE No. 100A HAS THE OCTAGON FRAMING RULE ON BACK.

	Polish	Ox. Copper	N. Plated on Copper
No. 3 Standard	$2.50	$2.75	$3.00
No. 100 Standard	2.75	3.00	3.25
No. 100R Framing	3.00	3.25	3.50
No. 100A Framing	3.25	3.50	3.75

Add ten cents to the price of the No. 100R and 100A if 1¾ inch tongue is desired.

Please send me without charge your little book.

Name _____

Town & State _____

NICHOLLS MFG. CO., Ottumwa, Iowa

Trus-Con Joist Hangers

Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.

Avoid cutting away and weakening of timbers and walls—save labor, time and money.

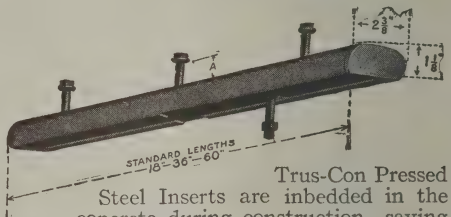
TRUS-CON JOIST HANGERS are made from open hearth steel plates, and are proven by actual test to be the strongest on the market. Note the bulb-shaped reinforcement at upper angle.

We also furnish Post Caps, Post Bases, Wall Plates and Base Plates made in rolled steel, malleable iron or cast iron.

Write for catalog and prices.

Shaft Hanger Supports for Concrete Buildings

Trus-Con Pressed Steel Inserts for Supporting Shaft Hangers in Concrete Buildings.



Trus-Con Pressed Steel Inserts are inbedded in the concrete during construction, saving expensive drilling after completion of the work. The long slots allow a wide variation in position. Special washers prevent bolts turning in the slots.

Write for details and prices.

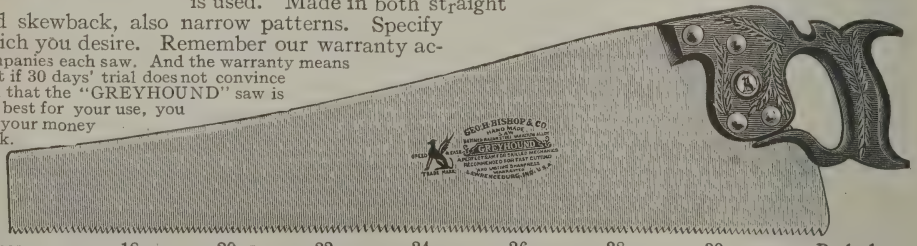
TRUSSED CONCRETE STEEL CO.

384 Trussed Concrete Bldg. - DETROIT, MICH.

Greyhound Hand Saws

The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. ***This saw will be imitated by others—but not equalled.***

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the best for your use, you get your money back.



Inches,	18	20	22	24	26	28	30	Net.	Packed one in a Box
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		

Order one today and let us take all the risk. If you want literature first, write us

GEO. H. BISHOP & CO., Makers, Lawrenceburg, Indiana

The NATIONAL BUILDER

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Fred T. Hodgson, Editor. **Charles A. Miller, Jr., Assoc. Editor.**

Published by The Porter-Hodgson Co., 539 South Dearborn St., Chicago

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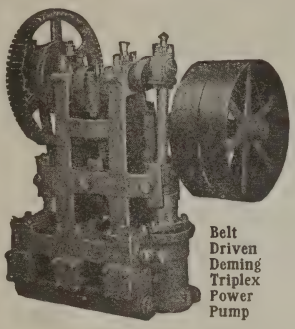

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DEMING PUMPS

May be belt driven or direct connected to electric motor, gas or gasoline engine. Made in all sizes for any service.

Ask for our Power Pump Catalog

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SALEM, OHIO

Hand and Power Pumps for All Uses

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A device combining usefulness, strength and convenience.

Saves Space!
Low Cost!
Strong and Durable!
Easy to Operate!
Operates Automatically!
Adds Value to House!
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We Allow Contractors Commission

Write for descriptive circular and price list to

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AKRON, OHIO

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Our Book No. 7 "Saw Points" tells all about Saws—how to set them, etc. It's FREE

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THE NEW CABOT'S "QUILT"

The Original Scientific Insulator and Deadener
50% Better Than Ever Before

IMPROVEMENTS

Made in 250 foot rolls.
Wonderfully strong, untearable paper.
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No creases or lumps.
18-inch strips to go between studs.

One layer is warmer than forty layers of common building paper. The only perfect sound-deadener.

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1123 Broadway, New York 350 Dearborn Ave., Chicago

Photograph of New Rolls of Quilt. Note narrow space in middle for splitting into 18″ strips.

THE NATIONAL BUILDER

Vol. 54 (48th Year) CHICAGO, MAY, 1912 No. 1

The Kendall Residence, built at Aurora, Ill.

National Builder Design No. 353.
Worst & Shepardson, Architects, Aurora, Ill.

For Floor Plans, Details, etc., see Supplement of this Number. Estimated cost, architect's fees not included, $4,622.74.

Estimate of Kendall Residence

By I. P. HICKS

EXCAVATING AND MASONRY.

236 yards excavating, 35c	$ 82.60
70 yards 3 in. concrete floor with 5 in. cinder filling, 90c	63.00
800 cubic ft. concrete foundation, 25c	200.00
18½ ft. chimney breast, $2.50	46.25
21½ ft. above breast, $2	43.00
Cistern	45.00
5,000 brick laid in wall, $12	60.00
275 yards outside plaster, 80c	220.00
Total excavating and masonry.	$ 759.85

LUMBER BILL.

	Feet.
1 6x8x14 ft. girder	56
1 6x8x16 ft. girder	64
40 2x8x16 ft. wall plates	840
53 2x10x16 ft. floor joists	1,431
53 2x10x14 ft. floor joists	1,219
13 2x8x14 ft. attic joists	247
18 2x8x18 ft. attic joists	432
16 2x8x20 ft. attic joists	432
124 2x4x18 ft. O. S. studding	1,488
28 2x4x12 ft. gable studding	224
12 2x6x18 ft. partitions	216

50 2x4x18 ft. partitions	600
58 2x4x16 ft. partitions	638
30 2x4x16 ft. plates	330
25 2x4x12 ft. plates	200
52 2x6x18 ft. rafters	936
26 2x4x12 ft. collar beams	208
30 3x8x7 ft. rafter ends	420
24 2x4x16 ft. dormers	264
4 3x8x22 ft. for gables	176
4 3x8x10 ft. for dormers	80
1 3x8x12 ft. for porch	24
4 2x8x12 ft. for porch	64
8 2x8x18 ft. for porch	192
2 2x8x10 ft. for porch	27
24 2x4x10 ft. for porch	156
20 2x6x12 ft. for porch	240
24 1x4x12 ft. bridging	96
10 2x2x16 ft. furring	55
10 1x4x16 ft. backing	53
10 1x6x16 ft. backing	80
	11,584
11,584 ft. framing lumber, $26	$ 301.18
2,284 ft. 1x6 fence flg., $28	62.95
2,500 ft. 3/8x2¼ face hardwood flg., $65	162.50
1,142 ft. 1x4 star flg., attic, $35	39.97
2,500 ft. 1x8 No. 2 sheathing, $26	65.00
220 1x4x10 ft. fir flg., $45	9.90
50 ft. 1x4x12 ft. fir flg., $45	2.25
220 ft. 5/8x4x10 ft. fir ceiling, $30	6.60
50 ft. 5/8x4x12 ft. fir ceiling, $30	1.50
6 1⅛x12x12 ft. fir finish	4.32
280 lineal ft. 1x10 cypress finish	11.43
60 lineal ft. 1x6 cypress finish	1.35
208 lineal ft. 1x8 cypress finish	6.11
1,100 ft. 5/8x4 fir ceiling, $30	33.00
800 lineal ft. 1⅛x6 cypress finish, $45	22.50
4 2x10x12 ft. cypress finish	3.60
2,050 ft. 1x6 No. 2 sheathing, roofs, $26	53.30
18M shingles, $4.50	81.00
Total lumber bill	$ 888.46

MILL WORK.

230 ft. 3 in. bed mold, 1½c	$ 3.45
120 ft. 2 in. bed mold, 1c	60
110 ft. 2 in. water table, 1¼c	1.38
136 ft. 4 in. beveled drip, 2c	2.72
340 ft. ⅞ quarter round ½c	1.70
80 ft. 2 in. band mold, 1c	.80
60 ft. ⅞ in. cove mold, ½c	.30

6 cellar wd. frames, 12x10, 3 lt., $1.75 ..... 10.50
2 cellar wd. frames, 10x10, 3 lt., $1.75 ..... 3.50
2 cellar wd. frames, 10x10, 2 lt., $1.50 ..... 3.00
6 cellar sash frames, 12x10, 3 lt., $1.50 ..... 9.00
2 cellar sash frames, 10x10, 3 lt., $1.40 ..... 2.80
2 cellar sash frames, 10x10, 3 lt., $1.00 ..... 2.00
1 front dr. frame, 3 ft. 4 in. x 7 ft. 4 in., rab. 1¾ in..... 2.75
1 grade entrance dr. frame, 3 ft. 0 in. x 6 ft. 6 in. rab., 1¾..... 2.60
2 mullion dormer sash frames, 3 wds., 6x6, 24 lts..... 6.00
2 twin frames, 36x28x24 div., $4.50 9.00
3 twin frames, 32x28x24 div., $6.75 20.25
1 twin frame, 22x32x24 div..... 4.50
1 mullion frame, 5 wds., 22x32x 24 div. 11.00
1 twin frame, 30x24x20 div..... 4.50
1 wd., 30x24x20 div..... 2.25
1 mullion sash frame, 4 wds., 12x 24 div. 6.00
1 mullion sash frame, 2 wds., 16x28 div. 3.00
2 sash frames, 16x28 div., $1.50... 3.00
2 twin sash frames, 6x6, 20 lts., $4.00 ..... 8.00
1 frame, 32x28x24, div..... 2.25
1 twin frame, 28x28x24, T 16 in. A 5.50
1 twin frame, 22x24x20 div..... 4.00
1 sash frame, 28x24 div..... 1.50
1 mullion sash frame, 3 wds., 24x32 div. 4.50
1 mullion sash frame, 3 wds., 18x 45 div. 4.80
1 mullion frame, 2 side wds., 28x 32x24 center, 2 sash drs., 1 ft. 8 in. x 7 ft. 0 in..... 10.00

WINDOWS.

6 dormer sash, 6x6, 24 lts..... 18.00
4 windows, 36x28x24, top S. div.. 18.00
6 windows, 32x28x24, top S. div. 21.60
2 windows, 22x32x24, top S. div.. 5.20
5 windows, 22x32x24 div., $2.60.. 13.00
3 windows, 30x24x20 div., $3.80.. 11.40
4 sash, 12x24 div., $1.50..... 6.00
4 sash, 16x28 div., $1.80..... 7.20
4 sash, 6x6, 20 lts., $2.50..... 10.00

1 window, 32x28x24 div	3.60
2 windows, 28x28x24, art, $4.50	9.00
2 transoms, 28x16, art, $3	6.00
2 windows, 22x24x20, div., $2.50	5.00
1 sash, 28x24, div	1.75
3 sash, 24x32, div., $1.75	5.25
3 sash, 18x45, div., $2	6.00
2 wds., 28x32x24, div., $3.60	7.20
2 sash drs., 1 ft. 8 in. x 7 ft. 0 in., 1⅜ div., $6	12.00
1 front door, 3 ft. 4 in. x 7 ft. 0 in., 1¾ in.	16.00
1 side door, 3 ft. 0 in. x 6 ft. 6 in., 1¾ in.	5.00
1 set jambs, cased open, 4 ft. 0 in. x 7 ft. 0 in.	1.00
1 colonnade, open	35.00
1 set jambs, 4 ft. 4 in. x 7 ft. 0 in.	1.00
1 set jambs, 2 ft. 8 in. x 7 ft. 0 in.	.80
3 set jambs, 2 ft. 6 in. x 7 ft. 0 in., 80c	2.40
4 set jambs, 2 ft. 8 in. x 6 ft. 8 in., 70c	2.80
1 set jambs, 2 ft. 6 in. x 6 ft. 8 in.	.70
3 set jambs, 2 ft. 4 in. x 6 ft. 8 in., 70c	2.10
2 doors, 2 ft. 2 in. x 7 ft. 0 in., 1¾, $7	14.00
1 door, 2 ft. 8 in. x 7 ft. 0 in., 1⅜	8.00
3 doors, 2 ft. 6 in. x 7 ft. 0 in., 1⅜, $8	24.00
4 doors, 2 ft. 8 in. x 6 ft. 8 in., 1⅜, $3	12.00
1 door, 2 ft. 6 in. x 6 ft. 8 in., 1⅜	3.00
3 doors, 2 ft. 4 in. x 6 ft. 8 in., 1⅜, $2.75	8.25
64 plinth blocks, 6c	3.84
196 ft. door casings, 7 ft., 2½c	4.90
224 ft. door casings, 6 ft., 2½c	5.60
308 ft. window casings, 5 ft. 4 in., 2½c	7.70
108 ft. window casings, 12 ft. 2½c	2.70
270 ft. door stops, 14 ft, 1½c	4.05
600 ft. window stops, 14 ft., 1c	6.00
184 ft. window stool, 2½c	4.60
184 ft. window apron, 2c	3.68
660 ft. head casing, 2½c	16.50
640 ft. base, 3½c	22.40
640 ft. floor mold, ½c	3.20
640 ft. cove cap, 1c	6.40
110 ft. lineal beam ceiling, 10c	11.00
Front stairs	63.00
Landing seat	4.00
Bookcase	23.00
Buffet	60.00
Mantel (mill work only)	10.00
Kitchen work shelf	18.00
Kitchen cupboard	7.00
Pantry shelf	8.00
Pantry cupboard	15.00
Kitchen towel drawers	6.00
Spice cabinets	7.00
Medicine cabinet	6.00
Case drawers	8.00
Linen cupboard	12.00
Total mill work	$ 808.97

CARPENTER LABOR.

11,588 ft. framing lumber at $10	$ 115.84
19½ squares rough floor, $1.25	24.06
19½ squares finish floor, $2	39.00
10 squares attic floor, $1.50	15.00
25 squares sheathing, $1	25.00
1,640 ft. ceiling porch floors, etc., $1.50	24.60
2,050 ft. roof sheathing, 80c	16.40
18 M. shingles, $1.75	16.40
19 squares smoothing floors, $1.50	28.50
300 ft. cornice, 10c	30.00
Setting frames	18.00
800 ft. outside casings, 2c	16.00
45% cost of mill work for finishing	364.03
Total carpenter labor	$ 747.93

RECAPITULATION.

Excavating and masonry	$ 759.85
Lumber bill	888.46
Mill work	808.97
Carpenter labor	747.93
Hardware and nails	79.00
Tin work	45.00
Plastering, 820 yds., 27c	248.40
Plumbing	305.00
Electric wiring	55.00
Mantel, brick, wood and grate	85.00
Painting	230.00
Heating	150.00
Incidentals, 5%	220.13
Total estimate	$4,622.74

There are approximately 28,000 cubic feet within the walls of this house, making the cost of construction about 16½ cents per cubic foot.

Publishers' Statement

Here you have a smaller National Builder and a larger one. Smaller in the page size, but greater than ever before in amount of reading matter, number of illustrations, plans and pages of advertising.

The new size makes the National Builder easier to hold on account of the more compact form, easier to read because of the shorter lines, easier and better for binding, easier to refer to, and when placed on your library table or shelves harmonizes more pleasingly with the rest of your books. Larger magazines, other than standard size, have a tendency to get out of shape quickly. The smaller but larger and more compact form of the National Builder will give you a more enduring book, one that will stand the thumbing better. The new size makes it even easier to find old favorites among both the reading and advertising pages.

This change in size does not mean a revolution in the policy of the paper. We are going to keep right on adding new features, improving the paper in every way possible, doing our level best to make the National Builder of even greater value than ever to our big army of readers.

Our friends, the subscribers and advertisers, are really very closely related. No question is of greater importance to the advertisers than being able to place their goods before the National Builder's clean-cut, progressive contractors and builders. The rule works both ways, for no question is of greater value to our contractors and builders than knowing that the men who are offering them goods through the shop windows of the National Builder are reliable manufacturers who are not afraid to

stand back of their materials, and whose statements can be accepted at full value.

In making this change in the appearance of the paper, and in keeping up the National Builder's policy of staying abreast of the times from every standpoint, we will admit the publishers have a personal interest.

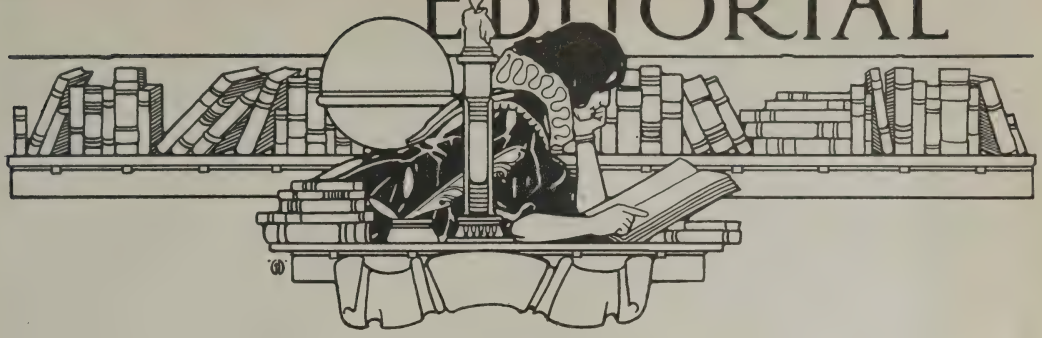
The bigger and better we make the National Builder, the more it will pay our advertisers, and consequently we can strengthen our own organization and give both subscribers and advertisers the benefit.

It is really a complete cycle of endeavor. We, the publishers, you, the readers, aud our mutual friends, the advertisers, are all banded together to help make the building business a profitable calling for everyone in it. What helps one of us helps us all.

We are not too modest to feel a little self-gratification in the part we are playing for the general uplift of the building trade as a whole.

Twenty-nine thousand subscribers was a list unheard of until the National Builder two years ago entered its active circulation campaign. These men are all progressive contractors and builders, and, we believe, our staunch, faithful friends. It is a family to be proud of.

EDITORIAL



SOME MINOR CHANGES FOR THE GOOD.

The National Builder feels the time has arrived for making some changes on the paper which we think will prove of advantage to our subscribers, our advertising patrons, and to the paper generally. The present number shows the extent of these changes—which are not revolutionary—but it does not show the improvements which are to follow. There is a reduction in the size of the paper, which is made more compact, and less ungainly; but this does not entail any diminution of reading matter, or reduction in the number or size of the illustrations. The detail sheet—which has always been a valuable feature—will be continued, and the latest and most approved designs of modern work will be illustrated and described, and estimated cost will be given from time to time. The subscription price per year will be reduced from Two Dollars to One Dollar and Fifty Cents, commencing with this May number, 1912. Our enlarged subscription list and generous advertising patronage enable us to offer this reduction, and other advantages, to our readers, who have stood by us so many strenuous years; and we feel it is but fair to have them enjoy a share of our general prosperity.

We take advantage, while announcing this new departure, to thank our readers and advertising patrons—one and all—for their past favors, and trust we may hold their confidence, their good opinions, and patronage for many a long day.

Fred T. Hodgson, Editor.

Whatever is worth doing, is worth doing well, even at a cost of time.

There are only two ways to do a thing, the right and the wrong way, and it is a muddle headed fellow who can't discover either the one way or the other.

A mistake is not a blunder, though often troublesome, but a blunder is a mistake of a very serious kind. The careful workman may sometimes make a mistake, but he never makes a blunder.

To discover a mistake, frequently requires some brains, but to adjust and rectify it, indicates and proves brains of a much higher order.

A comfortable room for the manager and his clerks in a workshop, neat and tidy, and an open shop with broken windows, slovenly kept floors, dirty looking machines and benches, do not work together in the interests of any woodworking institution.

Cleanliness is said to be akin to Godliness, and more conducive to good health; indeed, the former in woodworking establishments is much more in keeping with the modern spirit. A clean sinner makes for good, while a dirty saint radiates influences decidedly evil.

For ordinary—and even special—joiners' work, there is no wood that can compete with our Northern White Pine. Cypress, Yellow Pine, Gum, Mahogany, Oak and several other woods are all right, and in some cases are preferable to other woods, but so long as white pine is to be obtained at a reasonable price, it will be sought after and used for much joiners' work.

There is a beautiful wood—the Texan Locust—which will some day come into more frequent use for decorative work, and particularly for fine cabinet and carved work. It is of a deep cream color, and when finished and polished or varnished, shows up handsomely. It is firm, and looks something like Turkish Boxwood, and is almost as grainless and as heavy. It is hard, and cheesy under the cutting tool, but always satisfactory. Its finished appearance is always attractive and pleasing.

Another valuable wood, that has almost fallen into disuse, is White Ash. At one time, not more than half a century ago, American White Ash was in great demand for many purposes, and large quantities of it was exported, mostly to Great Britain, where it was used for building the frame work of cotton spinning jennies, looms, and other machinery about the cotton factories, before the introduction of iron frames. It is now used—when it can be obtained—for the frames of agricultural implements and machinery.

White Ash is a stiff, strong wood, durable, and easily worked. It shrinks but very little and stands heat without twisting or warping. When properly sawn from the log, it has a grain somewhat like plain sawn Oak, and can be made to look like it. It makes, when properly manipulated, fine trim for interior finish and may be stained to suit, and still preserve its figured appearance. Second growth White Ash—or "Rim Ash"—as it is called in some localities, is a very handsome white wood with a strongly marked grain, but is scarcely suitable for house work, as it does not grow to a size large enough to be of service to the joiner, but for small work where strength, elasticity and durability are required, it is equal, if not superior to Hickory, or Rock Elm; and like Hoop Elm, it has the quality of separating in laminations, without rupturing the fibres, when power and proper appliances are used for the purpose. In other words it may be riven into hoops, lath, or other work. Black Ash is a softer wood than White Ash, and has a grain very much like Chestnut—coarse and well defined. It is often employed in conjunction with Chestnut, for panels and similar work, in some localities, and when finished nicely, is easily taken for Chestnut work. It also has the quality of being easily riven. It is almost weather proof, and strong and tough when seasoned or partly dry. It was a favorite wood for "pins" to be driven through timbers to hold "tenon and mortice" together, in times when heavy timber framing "was in flower."

Spanish Mahogany holds the premier position in the estimation of the joiner. There is practically nothing in his art in which it could not be serviceably employed, its cost being the only limit to its use. The cabinetmaker makes the first claim, however, selecting the best figured logs for cutting into veneers, at the rate of thirty to the inch.

Cuban Mahogany (Spanish), is a dense, hard, strong wood, of very straight growth and close texture. It has small pores filled with chalk-like substance, in a rich brownish red color, with dark wavy markings. When curled in the grain (which is rare in this variety), it is much prized by cabinetmakers, and is usually cut into veneers, being too heavy and valuable to use solid. A single log containing some 120 cu. ft. has been sold for as much as $5,000. The market size of this timber is from 11 to 24 in. square by 18 to 36 ft. long.

Minatitlan is the largest Mahogany exported, logs of 4 ft. side being common; it is dark red in color, with straight grain, no figure, close texture and heavy. Tabasco is of a rich purplish red color, with open, porous grain and "rowey" figure, but it is very brittle. Santa Anna and Tonala each supply a good variety of a dark dull, red color, heavy, rather tough working, subject to star shake, and somewhat spongy near the heart: this being probably due to its rapid growth. Honduras Mahogany, the "Baywood," from Belize, is of a rich golden yellow, with "watered" appearance, easily worked, somewhat spongy texture, and does not warp or shrink much. It has but little sapwood, and is used chiefly for cigar boxes.

The habitat of the true Mahogany is the islands in, and the countries bordering on the Carribean Sea. That from the Islands is called Spanish, that from Central America, Baywood.

San Domingo (Spanish), is the handsomest of the Mahoganies. Its figure is "curly," "watered," "feathered," "bird's-eye," or "festooned," and its color a deep rich red with yellowish markings. It is a strong, heavy and difficult wood to clean up, the substance in its pores being very resinous or glutinous. It is a small tree, the average size of log being 10 ft. by 12 by 12 in. Bahama or Nassau mahogany is the smallest imported, the average size being 5 ft. by 10 by 10 in. It is similar in color to San Domingo, but harder, and of horny texture; has a beautiful, smooth surface and very curly grain, described as "veined." It has a solid heart but much sap. Mexican Mahogany generally is darker in color than most others of this species, but the varieties from the different districts vary much in appearance.

Architecture is the highest phase of building, and it is only just that the profession should consider carefully the qualifications of those seeking to enter its ranks, and should as carefully watch that the limits of its field are not encroached upon.

The state has an equally important interest in the matter. No regulation can be maintained unless sovereign power has real jurisdiction over building operations in general. The stability of the building is not the only factor in the case. There must be provision for light, ventilation, drainage, etc., all of which concern the health of the inmates even more than does the actual permanence of the structure. It is usually possible to leave a crumbling building when occasion arises, without loss of life, but a fault in the plumbing system may kill dozens before the cause is discovered. Wise laws prescribe what shall and shall not be done, and it is right that the supervision of the building, from conception to occupancy, should be vested in the master builder, the architect.

But who shall be regarded as architects? And when does a student become so proficient in design and construction and versed in office practice as to be considered an architect? Or when may a builder claim, through ability to construct, that he should be admitted to the profession? On another page is given one phase of the situation in which the builder wishes to become an architect.

But there is another side. A number of states, Illinois, California, New Jersey and others, have passed laws decreeing who shall be considered architects, their qualifications and duties. Wisely or otherwise, exception was made in certain cases where owners or builders wished to assume the responsibility for their buildings, and this provision or exception to the law has raised a serious question, in Illinois at least, regarding the attitude of those endeavoring to evade the entire act through the minor clause. Speculative builders and others wishing to avoid the expense of engaging a competent architect, have had plans prepared by draftsmen, competent, probably, to do the work, and have claimed exemption under the law. The result has been many plans have been prepared for which no real responsibility exists, and for which there is no architectural supervision after the plans leave the draftsman. The owner or builder claims he has to have the plans prepared by an "employee" and the draftsman solemnly declares "he" is not an architect, but merely employed to draw plans under the owner's direction. The board holds that this and similar work is an infraction of the law and has issued a notice to draftsmen and others, from which we quote:

"The State Board of Examiners of Architects, at its meeting held March 8, 1912, received a written opinion from its attorney, Charles E. Pope, defining what rights draftsmen and office assistants have under the law in making plans for buildings, and what rights are forbidden to them. Notice, therefore, is hereby given to all draftsmen employed in this state and all licensed architects and other persons employing draftsmen that the law will be strictly enforced against all draftsmen acting illegally in making plans for buildings."

In Section 9, Chapter 10a, of Hurd's Revised Statutes of Illinois (the architects' license law), it is provided that: "Any person who shall be engaged in the planning or supervision of the erection, enlargement or alteration of buildings for others, and to be constructed by other persons than himself, shall be regarded as an architect within the provisions of this act, and shall be held to comply with the same."

Another portion of Section 9 of the same chapter says: "Nothing contained in this act shall be construed to prevent any person, mechanic or builder, from making plans and specifications for or supervising the erection, enlargement or alteration of any building that is to be constructed by himself or employees."

Mr. Pope states, in his opinion, that it will be seen from this last quotation that in erecting the building for which "any person, mechanic or builder" is allowed to make plans and specifications, such person may have employees to aid him. But there is nothing said in the act as to whether "any person, mechanic or builder" may employ persons to assist him in making plans and specifications for such buildings to be erected by himself or employes.

Mr. Pope further says: "I do not believe that said Section 9 requires that any such 'person, mechanic or builder' must necessarily by himself, and with only his own hands, make plans and specifications for buildings to be constructed by himself; but he must do such a part of the work of making said plans and specifications as to make said plans and specifications essentially and practically his own. He cannot, under the act, either have his regular draftsmen, employes or persons not his regular employes, perform such work on plans and specifications for buildings to be constructed by himself, as to make said plans and specifications essentially and practically their plans and specifications, and not his, and have such employes, whether regular or occasional, necessarily exempt from prosecution under the act, the pivotal question is as to whether such plans and specifications are essentially the work of such 'person, mechanic or builder,' or essentially the work of someone else.

"I am of the opinion that any such draftsmen employes, whether regular or only occasional draftsmen employes, of such 'person, mechanic or builder,' who are engaged in the making of plans and specifications for buildings to be erected by such 'person, mechanic or builder,' and who performs such work on such plans and specifications as to make the plans and specifications essentially their own, must be regarded as practicing architecture within the meaning of said Section 9, and are liable to the penalties denounced under the act for practicing architecture without being licensed so to do."

ARTISTIC BUNGALOW SCHOOLS

by HORATIO A STOLL

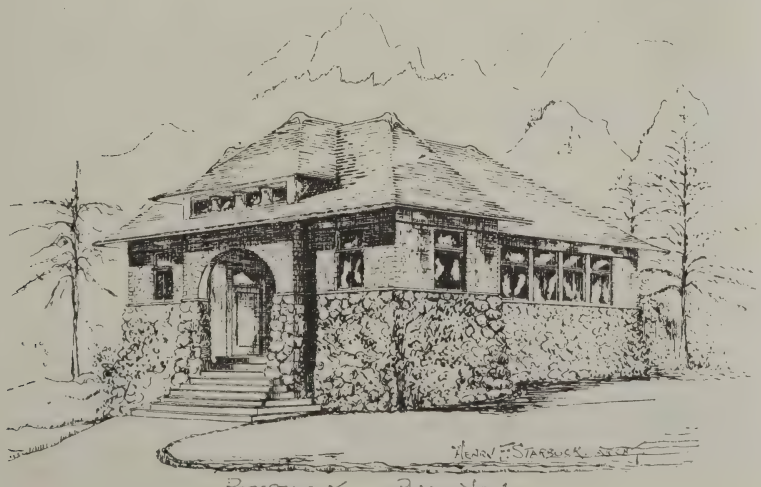
THERE WAS A TIME when "the little red schoolhouse" in the rural districts of California meant a rude, ungainly square box of a building. But nowadays, as soon as the population of a district is sufficiently large to require a school, the new community insists upon an attractive structure, no matter if it contains only a single room.

As a result, California is dotted with picturesque little monuments of education, the majority of the newer buildings being treated in the mission style of architecture, which is enjoying a great vogue on the Pacific Coast.

Henry F. Starbuck, who has taken an unusual interest in ornamenting the country side with buildings of this class, believes that no matter how small and inexpensive a school building may be, "it should express something of an architectural idea to the young child whose first impulse in this direction may come from the building in which he learns the rudiments of his future education."

The suggestions which he has offered in the perspective drawings and floor plans shown herewith give a good idea of the charming effects that can be achieved at little expense. In plan No. 1, he shows a conventional design that would be suited to any village or small town, and also a rustic design in which he has introduced the local stone and shingle finish more adapted to rougher or mountainous sections. Plan No. 2, is intended for a timber section where the log cabin effect can be used to advantage, while plan No. 3 is a simple bungalow treatment appropriate for any flat section.

The mission building with the open court surrounded by an arched corridor makes an

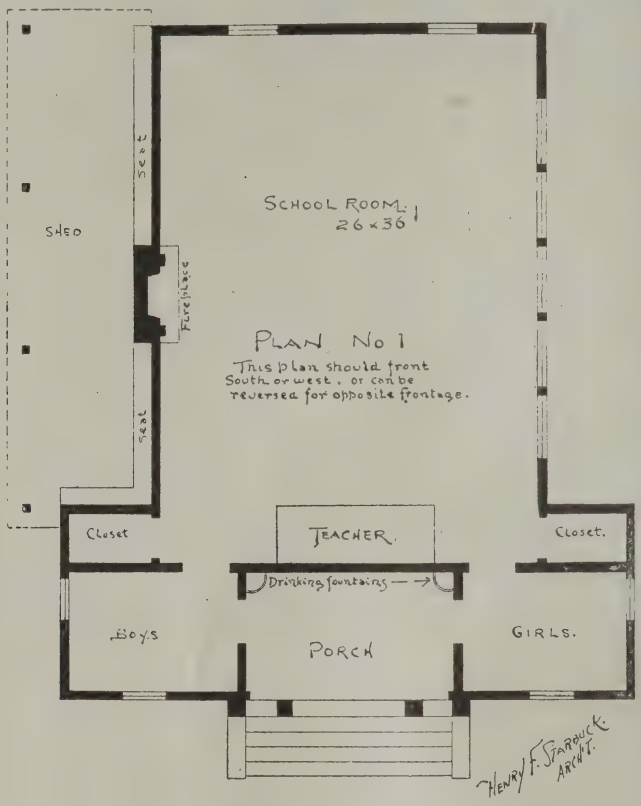


PERSPECTIVE PLAN No. 1

attractive school building, the white cement plastered walls, red-tiled roof and green lawn forming a pretty color combination.

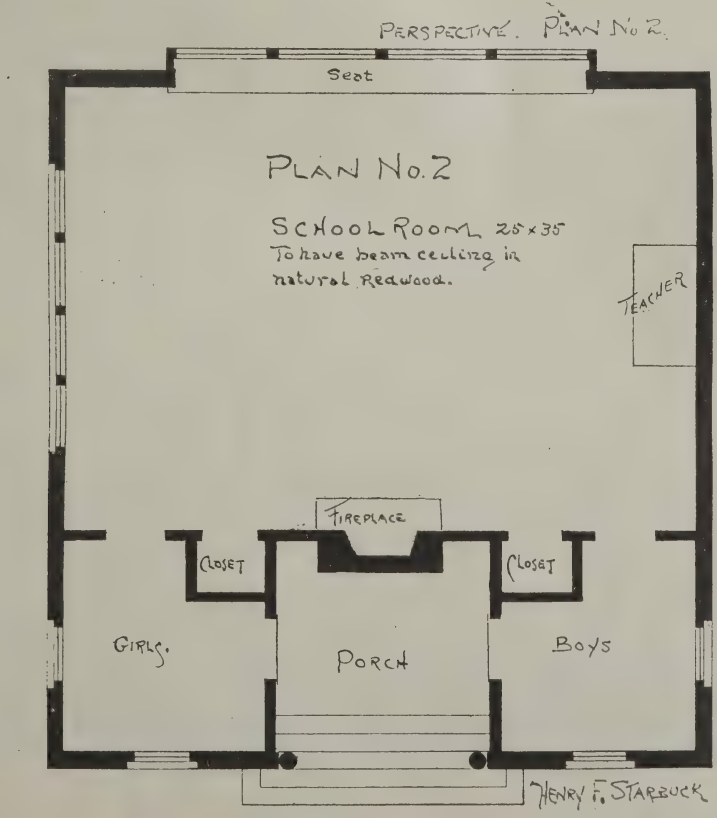
In discussing the erection of small country district schools, Mr. Starbuck recently said:

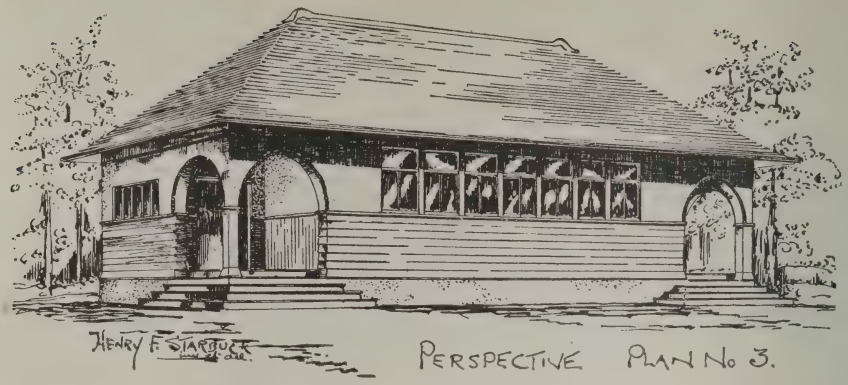
"In designing the class of building required for the rural districts there is a great range of ideas which can be adapted. In the first place, the location should be considered. The architect can properly use in some place every style of architecture which has appealed to the artistic sense of the student. And in the country school, where we are not likely to be handicapped by want of room, and where we may allow the fancy some play, we can design with free hand, keeping always within the line of practical common sense. And architecture is always common sense.



"The next feature of this class of buildings to be developed is the material. All kinds of material offer themselves to the true architect. In our mountainous sections, what better or more architectural material than the stone which abounds on every hand? Under the direction of some intelligent master workman much of this work could be done by the people of the district, and thus a general interest be aroused which would be the beginning of better things.

"In the timber districts, what would be more truly architectural than a log cabin





effect of natural logs? I can imagine the most pleasing results from this line of suggestion. In fact, it is the only real American style of architecture, and is worth developing for general reasons.

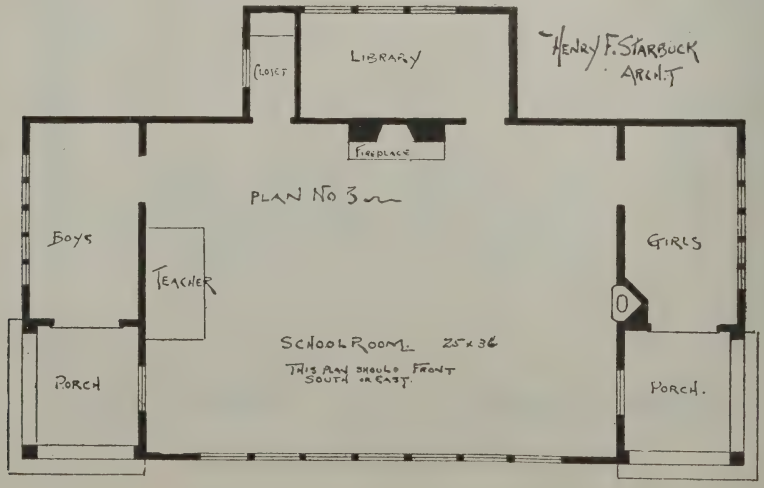
"In other locations, the broad bungalow effect is suitable, and it is somewhat strange that this style has not been more generally adopted. It is peculiarly fitted to California, and is economical in construction and attractive in effect.

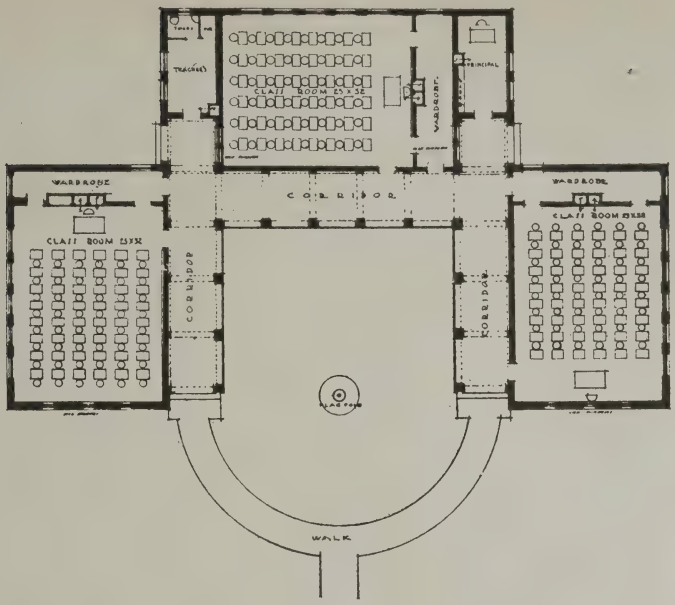
"For the portions above the reach of the hands of mischievous pupils, a most excellent finish for the exterior is cement plaster, on either wood or metal lath; the latter preferably in locations at a distance from the ocean. In the vicinity of the coast it is short-lived, and has been known to rust out entirely in a short time.

"In the matter of technical detail, the same rules should be followed as in the large city buildings. I am not a faddist in matters of light, heat and ventilation, but these should be considered with careful study, having in mind the means at hand available for the purpose.

"Light should be plenty, and on both left and rear, the greater amount on the side. While unilateral light is very strongly advocated by many, I do not believe it the best for the average rural school building. The location, however, may determine this to some extent, and if the amount is sufficient it may be the best in some cases. My own observation is that the main point is to have plenty of light, and of course, not in the face of the pupils.

"Ventilation is a most important point, also, but in the small buildings of the outside districts it is not always possible to have anything like a ventilating system or apparatus, consequently the only thing to do is to make such provision as can be without too much expense.





Ground Floor Mission Patio Building.

"Where the cost can be afforded the best and most effective mode of heating these small buildings is a hot-air furnace, which, in a pit under the building, can be made to heat thoroughly all the rooms, and as the heat is carried by a flow of warm air through the furnace, ventilation is also furnished by the influx of this into the room, which can be allowed to pass out by the windows, or through openings prepared for the purpose."

It is good to find an architect of Mr. Starbuck's prominence taking an interest in modest buildings of this sort, for the financial returns hardly warrant a busy architect giving the time and trouble necessary to look after them. From his plans, however, it will be seen that with a little planning even small and inexpensive schoolhouses may be made neat, artistic, comely and attractive.

Attractive Mission Schoolhouse.

Advice to a Builder Who Aspires to be an Architect and Has Respect for the Law

THE following correspondence is published by consent of the writers. It is only an incident in the experience of the Secretary of the State Board of Examiners of Architects; but serves to give information which will be valuable, not only to the particular builder involved, but to hundreds of others who do not comprehend the meaning and purposes of the Architects' License law, or how important it is for a builder to know much more than his own experience has afforded as preparation for the practice of architecture as a profession.

This correspondence explains the actual relation of the rural builders in small towns to the operation of the law, better than could be done by a carefully prepared essay, and is commended to the attention of carpenters and contractors throughout the State of Illinois and other states which require the examination and licensing of architects. It explains not only one phase of the operation of the law, but calls attention to the bad practice of some builders in allowing owners to use their plans, in case those who made them do not get the jobs to execute them—a practice that is detrimental to the interest of builders and owners alike. It will be seen that the builder who wrote to the State Board was not guilty of such a practice.

"....."

Contractor and Builder,

To the Board of Examiners of Architects,

Gentlemen: I draw a number of plans for small buildings that I erect myself, and often am asked to furnish plans for other bidders on the same jobs, and of course I often lose the jobs, also my time in preparing the blue prints and specifications. Of course I never make any charges for work of this kind, as I do not permit the plans to be used in the erection of the buildings except where I take the contract myself and have my men do the work, but I am often offered pay for the use of the drawings where I fail to get the work, and I would like to know just what the law is in regard to the same; also what is required in an examination for a license to practice architecture in Illinois. Yours very truly,

---

PETER B. WIGHT,
Secretary and Treasurer of the Illinois State Board of Examiners of Architects,
1113 Chamber of Commerce,

Chicago, Nov. 8, 1911.

....., Ill.

Dear Sir: I am in receipt today of your letter of the 6th instant.

Your letter shows that you have been acting like a square and honest builder who has respect for the law, and not like some of those who are trying to get around its requirements and encroach on the rights of architects who comply with the state law.

The latter part of section 9* was drawn to protect the rights of builders who make their own plans, and puts a construction on the law so that it will not be misunderstood. Yet some builders claim that it allows them to act as architects, because they have made plans and fail to get the job. They can be prosecuted for practicing architecture if they receive pay for their plans under those circumstances. You are right in refusing to give up the plans when you do not get the job. Whatever time and expense you have put on them should be regarded as part of your expense in looking out for new jobs. Owners should not use your plans for getting other bids. Passing one builder's plans around among others leads to unlawful combinations between builders to put up the price on owners.

This is what I think should be the proper practice for builders in small towns: If an owner is not satisfied with your price on your own plans, and other bidders offer to do the work for less, the owner should return the plans to you and tell them to make their

*"Nothing contained in this act shall be construed to prevent any person, mechanic or builder, from making plans and specifications for or supervising the erection, enlargement or alteration of any building that is to be constructed by himself or employes."

own plans. For fair competition, each bidder should make his own plans. But it is best for the owner, if he wants competition, to hire an architect.

Yours very truly,
PETER B. WIGHT, Secretary.

"....."
Contractor and Builder.
Mr. Peter B. Wight,
Chicago, Ill.

Dear Sir: I received such a nice letter last Fall in regard to licensing of architects that I am taking the liberty to write you again and ask your advice. I am sending you a drawing, also blue print copy of same, showing about the quality of work I put out now. I have only a common school education, and all I know about this business is what I have picked up by my own efforts and experience as a builder. I have built a number of churches, schools, etc., but mostly residence and other work in the rural district. Now, what I want to ask you is this: whether you think I could pass the examination for license or not; also what kind of a text book would be best for me to get bearing on the subject. I was thinking of Kidder's, or do you know of a better authority?

Now, the most of the larger jobs I have put up have been planned by architects, although two of the churches and one school were planned by me. But the most of my plans go in the country among the farmers, and, by the way, they are getting in the market for some pretty good jobs, and, located as I am, I get lots of it to do. Now, I have no inclination to in any way evade the state law, but would like to comply with its requirements in every way, so would like for you to advise me what course to pursue and when and where you hold your next class examination; also what is the examination fee. Any information you will give me will be greatly appreciated by me.

Yours truly,
.....,

P. S.—25 years' experience in building.

STATE BOARD OF EXAMINERS OF ARCHITECTS,
1113 Chamber of Commerce Bldg.,
Chicago, March 8, 1912.
....., Illinois.

Dear Sir: In reply to your letter of March 4, 1912, you ask whether I think you could pass the examination for license to practice in this state as an architect, in view of the exhibits you have submitted, and what text books I would recommend to you for study to enable you to pass an examination.

I will first inform you that you are only the second of nine hundred applicants for licenses that has asked the first of these questions during the fifteen years that I have served as the Secretary of the State Board of Examiners of Architects. This is remarkable, in view of the fact that during these years, up to the present time, 266 applicants have failed in class examinations, many of whom could have saved their time and expense if they had candidly asked the question that you and the other man did. You must bear in mind that it would be very improper for a public officer to voluntarily advise candidates that they are not likely to pass, even though it appears in very many cases, from the nature of the answers to the twelve questions in the blank applications, that the candidates can have little hope for procuring a license.

I will now answer your first question as candidly as you have asked it, and will say that from what information you have given me I do not think you could pass our class examination. The drawing you sent me is admirably done, but it is only the detail of one window sash, frame, and its setting in a brick wall, with accessory trimmings. The photographs of buildings that you have submitted show your skill as a contractor and builder, but our experience has shown that men may be skillful and successful builders, and may erect excellent buildings from plans made by themselves, but may not be qualified to pass examinations as architects. The reasons are these: The builder has not been accustomed to make plans and specifications that so definitely describe all the details of construction and design in such a manner that, by using them as part of a contract, he is able to compel another person to carry them out in every particular and enforce the completion of the work without alterations extra expense. His plans may have been sufficiently complete to enable him to carry out the work as he intended to do it, and he may have completed the work honestly, putting in all that was in his mind to do, but which he could not compel another to

do under the same plans and specifications. It is an architect's business to include everything in his plans and specifications, and to prepare them in such a way that the contractor cannot evade their requirements. He can only learn to do this by service with an experienced architect. That is what is called "office practice and supervision." The builder who plans for himself and the architects who plan for others look upon their work from two opposite points of view.

The examination is mainly devoted to ascertaining what ability the candidate has in making application of the knowledge previously gained to the ordinary practice of an architect, and therefore he is put in the position of a practicing architect, so far as possible, during the three days allotted to the work. To one who is not acquainted with "office practice and supervision" this may be embarrassing, but it is necessary for any person who commences the practice of architecture. The candidate is even allowed to use books of reference in the class room, for part of the preparation of an architect is to know how to use them. No matter how much a man may know about construction and design, he is not fitted to commence the practice of architecture unless he knows how to use them. Just so tools are of no use to a mechanic unless he can use them skillfully.

Architecture is not a trade, but the law has made it a learned profession. An architect has to know much more than how to draft a plan of a house. Too many persons think if they can plan a simple and ordinary house, they are therefore competent to practice as architects. But how to do that is only the beginning of what any architect is required to know. The practical experience of a mechanic is often valuable to any one who desires to become an architect; but in order that he may attain great success in the profession it is necessary that he supplement his practical work with hard study. I know of one case in which three carpenters working together at one time on a large job all became successful architects. It was nearly a hundred years ago in the city of New York. An old architect for whom I worked more than fifty years ago told me that he once was a journeyman carpenter and worked alongside of Edmund Hurry, under Minard La Fever as foreman, in building the old United States Hotel, in New York. La Fever afterwards became highly educated and was very distinguished in his profession. He designed some of the finest buildings in New York and Brooklyn and wrote several books on architecture. His classical details set the styles in house architecture and decoration in New York from 1830 to 1850.

Therefore, I can only say that one kind of preparation that a builder who desires to become a licensed architect needs, is a service as draftsman and superintendent with an architect having a good practice in the designing of various kinds of buildings of as much importance as those which the Board covers in its examinations; and these are the average sized buildings, but do not include either frame buildngs or elaborate skyscrapers.

With regard to your second question as to what kinds of text books you should read, you have mentioned one of the best you can select, if you refer to Kidder's Building Construction, in three volumes, a revised edition of which is now being prepared. Kidder's handbook is only a book of reference, but you should become familiar with how to consult it, and use it as such.

I think you will find in the application blank, which I send you, all the other information that you have requested, even if you do not intend to use it at present.

Yours very truly,

PETER B. WIGHT,
Secretary.

March 11, 1912.

Mr. Peter B. Wight,
Chicago, Ill.

Dear Sir: Your letter at hand, also copy of Supplement to Seventh Biennial Report of State Board of Examiners. I am more than thankful to you for the information you have given me, also I thank you for the pains and interest you have taken in my case. I will not try for a license this Spring, but will study and try to qualify myself for it at another time. You will hear from me again, I trust, next Fall, for I never have yet started anything that I have not finished. I am in the city quite often and when I am there and have an hour to spend I will drop in your office and see you.

Yours truly, ...

Roofing with the Steel Square

By J. H. B.

A BRACED DOUBLE COLLAR BEAM ROOF.

(NOTE: The editor of the NATIONAL BUILDER has received several letters from subscribers, complaining that these papers show methods that are somewhat obsolete and not nearly equal in efficiency or rapidity to those employed by American roofers.

The editor is well aware of these facts, and

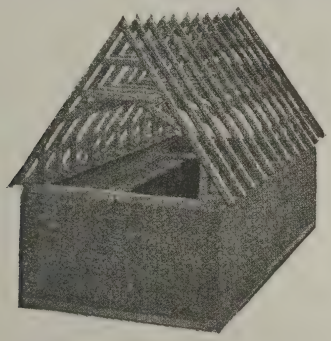


Figure 117. End View of Roof.

begs to say, that the papers are not published because of there being much in them that is unknown to the American framer, but more particularly to show our readers how English, and some Continental workmen, make use of this thoroughly American tool, the steel square, to accomplish their purposes. The series as given is being published in The Building World (England), a well informed, and well conducted journal, and so far as these articles on the steel square are concerned, it may be taken for granted they are correct and reliable.

The expert American framer may find something in these articles that may be useful to him, and he certainly will be interested in the methods employed. They cannot fail of being interesting, useful and instructive to our younger readers, who far outnumber our older ones, and this is one of the main reasons of these appearing in this journal.)

In the photographs, Figures 117 and 118, are shown two different views of an open roof suitable for a large hall or a church, or on a smaller scale for a porch or lychgate. It is fitted with struts and short ties at the bottom, the ties forming overhanging eaves. The principal collar beam is somewhat more than half way up the rafters, to which it is braced on either side, and a short usually has a moulded edge, rests on the inside. In setting out the roof, arrangements should be made to bring the bearings of the collar beam is fixed higher up, the length of the rafter being divided up into five separate bearings, making a very strong roof.

In this roof each pair of rafters is a separate truss, and a ridge is dispensed with, the boarding with which the roof will be covered forming an effective means of fixing the rafters in position. Buildings which would be roofed in this style would naturally have thick walls, forming resting places for two wall plates, as in the section Figure 119, and shown to a larger scale in Figure 120. The outer plate rests on the outer surface of the wall, and the inner one, which upright struts immediately over the inner wall plate as shown.

In the photographs the eaves are shown finishing level with the upper side of the wall plates, though projecting beyond them, as in the section (Figure 119). In Figure 120 the foot of the rafter is shown running below the wall plates, and Figure 121 shows

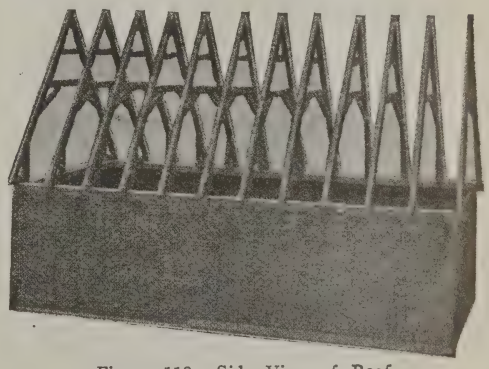


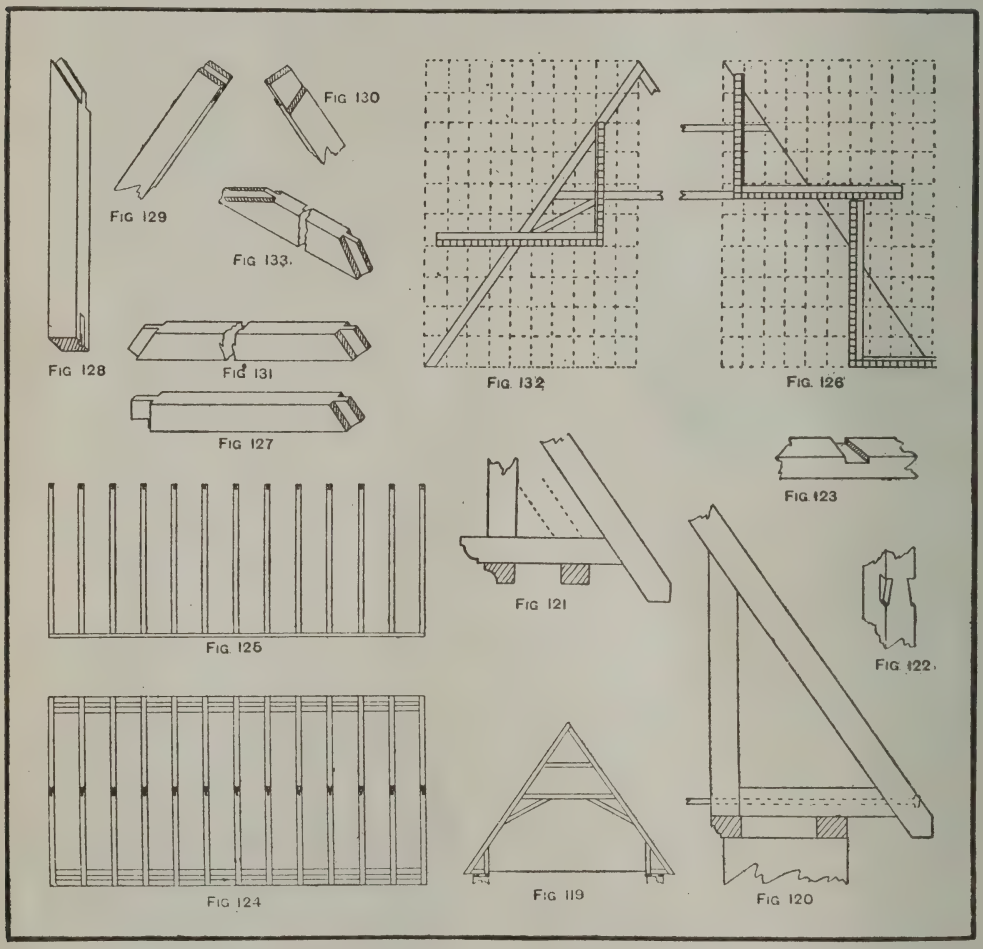
Figure 118. Side View of Roof.

it running lower still, the short tie being allowed to project over the inner wall plate and finished with a moulded end, the strut being tenoned into it instead of the tie being tenoned into the strut as in the other examples.

The necessary ties from side to side of the roof take the form of iron bolts passing

through the short ties, as in Figure 120, or fixed immediately over it, as preferred. This bolt may be in one length, with head at one end and nut at the other, or it may be headless, with a nut at each end, or, what is perhaps better, it may be in two pieces and tightened up by a link nut in the middle. This latter necessitates the threading of one side of the short tie and upper side of the wall plate respectively. The ties should be dovetailed into both the inner and the outer wall plates, and should be a close, if not a very tight fit.

The plan and elevation of the roof are shown in Figures 124 and 125 respectively, and these show the double wall plates, also



bolt in each tie with a left-handed thread, so that the turning of the link nut will tighten up on both rods. One great advantage of the latter form of tie-rod is that it may be tightened up, if necessary, at any time, so as to counteract shrinkage of the wood if any takes place.

Tie-rods will not be needed at every truss, but only at about one in six; but all should be fixed to the wall plates with dovetails, as Figures 122 and 123, which show the under the connection of the rafters at the top by slot mortice-and-tenon joints.

One-half of the roof in section is shown plotted out in squares in Figure 126, each square in width representing 12 in., which brings the height (for a roof with a pitch of 35 degrees) of each square 17¼ in. Thus to obtain the length and bevels of the rafters the square must be placed as shown in the lowest position in the drawing, and advanced along the scantling ten times; this

will give the length of the rafter as in Figure 119. Any extra projection as in Figure 120 must be allowed for.

The hypotenuse of the triangle formed by the square placed as above will give the bevels for the shoulders of the short ties, and also for the strut, which come to the rafter. These, when cut, will be as Figures 127 and 128, and the length of these two members can also be obtained correctly in this way.

The angle of the shoulder and slot mortice at the ends of the rafters (Figures 129 and 130) will be the same as the angle of the roof at the top. In this case it is practically 20 degrees.

The length of the collars will be found with the square in the upper position in Figure 126, where the squares are shown to four times the scale of the dotted rectangles for the sake of clearness. Thus the length of the lower collar from the longest point of the shoulder to the middle will be 4 ft. 6 in., or 9 ft. the full length. The angle of the shoulders will be the same as that of the short ties at the bottom of the rafter, shown by the hypotenuse of the square. This collar is shown in Figure 131.

The shoulders of the upper collar beam will be cut to the same angle as the other, and the length will be found in the same way as shown in Figure 126. The length will be half what the lower one is, that is 4 ft. 6 in.

It will be noticed that in Figure 126 the one line only represents the rafter, so that in getting the length of the same this will be the back, and in getting the length of the collars it will be the inside. This simply has the effect of bringing the collars so much lower down than they are shown, and does not affect the general principle in the least.

The method of finding length and angle of the braces is shown in Figure 132, where the square is placed to the extremities of the brace at the rafter and the collar, and the hypotenuse gives the length. In the drawing it is 4 ft. horizontal and 2 ft. 4 in. vertical, the diagonal of these being practically 4 ft. 8 in., which will therefore be the length from point to point of the shoulder fitting to the collar, and the other end will have to be at the same angle to fit to the rafter. The brace as cut is shown in Figure 133.

All tenons should be of sufficient length to allow of their being pinned up and drawbored. It is important that all parts fit well together, each pair of rafters being independent of the others; the shifting of some parts and the others remaining as they were will soon cause the roof to go wrong.

For a stronger roof in the same style the trusses as shown may be used as principals only, purlins being fixed on to them as in a king- or queen-post roof and the roof props then formed with common rafters. If this is done the rafters in the trusses instead of being where they are shown in relation to the wall plates, should be brought immediately over the outer wall plate, as dotted lines in Figure 121, the position of the present outside rafters being taken by the common rafters, which in this case will fit to a ridge at the apex of the roof. This ridge should be fitted to and resting on the inner principals, the top of which would be cut off to form a resting place for it.

Cost on Small Contracts

Submitted by E. F. RYAN in Our Recent Contest

AN ACCURATE estimate of the material required for the proposed work is first made out in duplicate, the carbon copy remaining permanently in the book.

It is generally better to make out separate estimates for the material furnished by different lines of business, as for lumber, hardware, painting, etc.

If any of the labor is to be sublet, it is also made out in this same way and in the absence of plans, a short description of the work and material required, if any, is given.

The name of the person for whom the work is to be done is also written on the estimate and those giving prices are instructed to put this name on also. This

keeps the material of one job from being confused with another, where the contractor has several jobs on hand at once.

The estimates being carefully prepared, the perforated leaves are detached and given out for figures, labor or material as the case may be, and are returned as soon as those bidding have secured a copy. As soon as prices are given on the material or labor, they are written on the carbon copies remaining in the book.

These, together with the cost of day labor, which should also be estimated in this same book, although a copy need not be made of it, form the basis of the price to be made on the building or contract.

If the business is secured, the loose leaves are used to check the material as it is delivered and for reference by the workmen; if the job is not secured, the price at which it was let could be entered in the estimating book for future reference, giving an idea of their competitor's figure on work to come up later.

In delivering an estimate, it is well if all of any one item could be placed on the ground at one time, thus if there is 100-2/4-16, it is much easier to check them at one delivery than several deliveries. Of course, this cannot be done with perishable material or where room is limited.

The dimension and sheathing, if possible, should all be at the building site before the carpenters begin work. These could be piled by the drayman so that they could be counted in a few minutes.

It is better to have the material delivered in as large loads as possible, as aside from the saving in drayage it is easier to check one large load than several small ones and with a little forethought this can almost always be done.

Where a few pieces are sent by a dray, the tendency is to forget to check it off at all. At first most contractors check up the deliveries quite carefully; as the work advances, many become more and more careless and in the end the inaccuracies are so apparent that the whole time spent in checking is wasted as in case of dispute it would not stand in court. Where extras are needed, it would be well to make as few orders as possible by looking well ahead to see what is needed. These could be written on a small account book, the leaf torn out, and sent to the material man, then returned with the material and filed for future reference. An account should be kept of all material returned and in this same small account book.

Where men are employed by the hour they write out their time checks for signature and on the back of the check is the number of hours and the job or jobs on which the work is done. Payments for material are made by check and the job on which the payment to be applied is also written on the check. At the completion of the contract, statements from the firms furnishing material are requested. These are checked and errors, if any, corrected. The amount of the various statements are placed in the duplication book with their estimated cost for future reference. The checks for labor are handled in the same way. The cost of labor furnished by the different trades are totalled and placed with their estimated costs for future reference.

A contract handled in this way takes no bookkeeping work at all. The checks and statements show the entire transaction, how much and for what. The small contractor who works with saw and hammer himself cannot keep books where much bookkeeping work is to be done. In theory it seems possible and perhaps is possible, but in practice, not one in a hundred would keep an accurate account year in and year out, or on even one job.

In a vast majority of cases, the material men will furnish more accurate bills without any checking than will the average small contractor, who undertakes to work and do his own bookkeeping. However, it is desirable for the contractor to count and see that he gets what he pays for, as all men make some mistakes and some, if not watched, would be dishonest. Where a contractor works himself, the simplest and easiest way is best, because if there is much work or complication about the book work, it will be neglected.

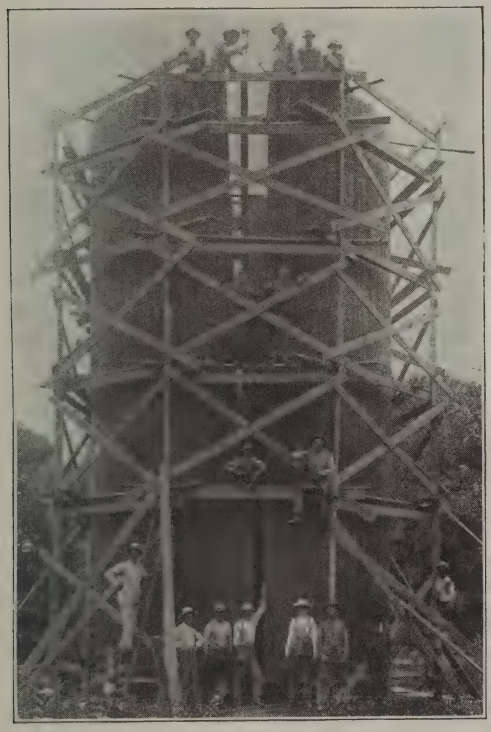
As outlined above, this work is done mostly by the material men, and workmen, leaving the boss to simply verify their accounts.

Rapid Silo Construction

By WALT S. KYLER

AS I was chosen to superintend erecting 180 silos last fall, I will give my experience. I started with ten men, and in a week every man had a gang of men at work. This is how I did it:

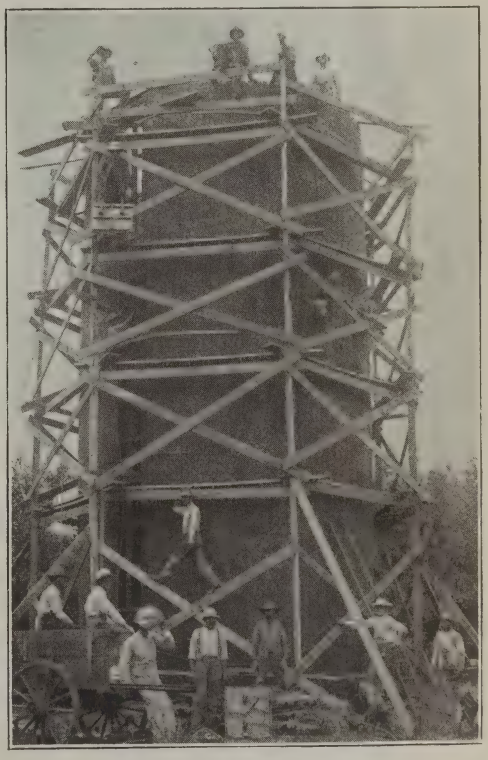
Located door frame on foundation where wanted. Drove stake 2x2-18 inches long



Setting Last Stay.

in ground. Raised frame with three guy ropes, each rope 75 feet long. I did not stop to plumb frame. Then raised first scaffold post 2x6-4 feet by my 2x2 stake, which set straight out in front of door frame 36 inches. Now, I used 1x6-16 feet cypress rough for scaffold braces around first set. My 2x6-10 feet 2 inches apart, making 8-2x6 posts for scaffold on a 20 foot silo. Before I nailed solid plumb all 2x6 posts both ways so as to be true. Then I used 2x6-12 feet to lay run boards on, three nails to each post, using 2x10-14 feet for run boards. First run about 14 feet from the ground for 36-foot silos. Then I put two men to nailing on 1x6-12 for two run 7 feet 4 inches high, two men using 1x6-15 feet for braces as you see in posts. By the time they are around, I had men passing up 2x10's for two run, and as I went up, more men were dropped in to work .

I use about eight men on 16 to 24 foot silos 36 feet high. Now, I take off two braces straight across from door so I can get in the stays. Cut about twenty pieces 1x4-3 feet 6 inches long to use, six pieces to nail to the door frame, two at the bottom to post, two at the center and two at the



Putting Up Doors, and Ready for Hoops.

top. Plumb door frame, nail to scaffold. Now bring in stays, having two men with ropes at top to pull up the end of stays, using timber hitch on stays. Two men to nail stays with 3/8x3-12 foot battens on outside at top, two men also at bottom using 4-

penny common nails, not galvanized. Get stays up, don't stop to get a close fit, for when put on hoops they will come up. I use four guys in case of a hard wind and to hold scaffold steady, also 2x2-18 feet long at scaffold posts. Now, I get one man to space off for hoops, using 16d. nails to lay hoops on, but don't drive nails through the silos, also three men to dig holes to plant dead men for our guys to silo. I use a ¾-inch rod 5 feet long with two taps and some old discarded discs off of some farm tools, and one bucket of cement, two of gravel. By the time we are done with setting stays, some are laying up hoops. Now, I use for a coaxer, as I call it, a short rod 18 inches long to get the first hoop on. I always put on two hoops from bottom first, then one in the center, then one next to the top, and two men run up cable and connect two hoops next to the top. All are connecting hoops now. Two men are taking down scaffold, one man sees all hoops are adjusted the same, taking nails out of scaffolding lumber and piling it up on a wagon for the next job.

I will now give you the bill required for the silo and would say we got up all of our silos and there was no one hurt. This photograph shows one I erected this way in three and a half hours at Malta Bend, Mo., with ten men and two boys, and you bet we had visitors:

8-2x6-36 feet.
18-1x6-16 feet cypress.
52-1x6-14 feet.
42-1x6-12 feet.
32-2x10-14 for running boards.
3-2x2-12 feet for stakes.
5-1x4-14 feet to use in holding stays to scaffold.
18-⅜x3-12 feet battens.
12 lbs. 10-penny nails for braces and run boards.
10 lbs. 16-penny nails for hold up hoops.
6 lbs. 4-penny nails for 2-inch stay.

Casement Windows

By PETER DIETZ

THE accompanying drawings show a casement window, as they are used with variations in the greater part of Europe, and especially in Germany, where they are used extensively. The drawing shows plan, elevation from inside, and sectional elevation, and how it can be used in connection with an ordinary window frame. The two bottom sash, which work out just like folding doors, and the transom are hung on hinges and swing inward, leaving the outside of the frame clear to receive the window screen. The dotted lines on plan show how the bottom sash swing open, and in the sectional elevation, how the transom opens.

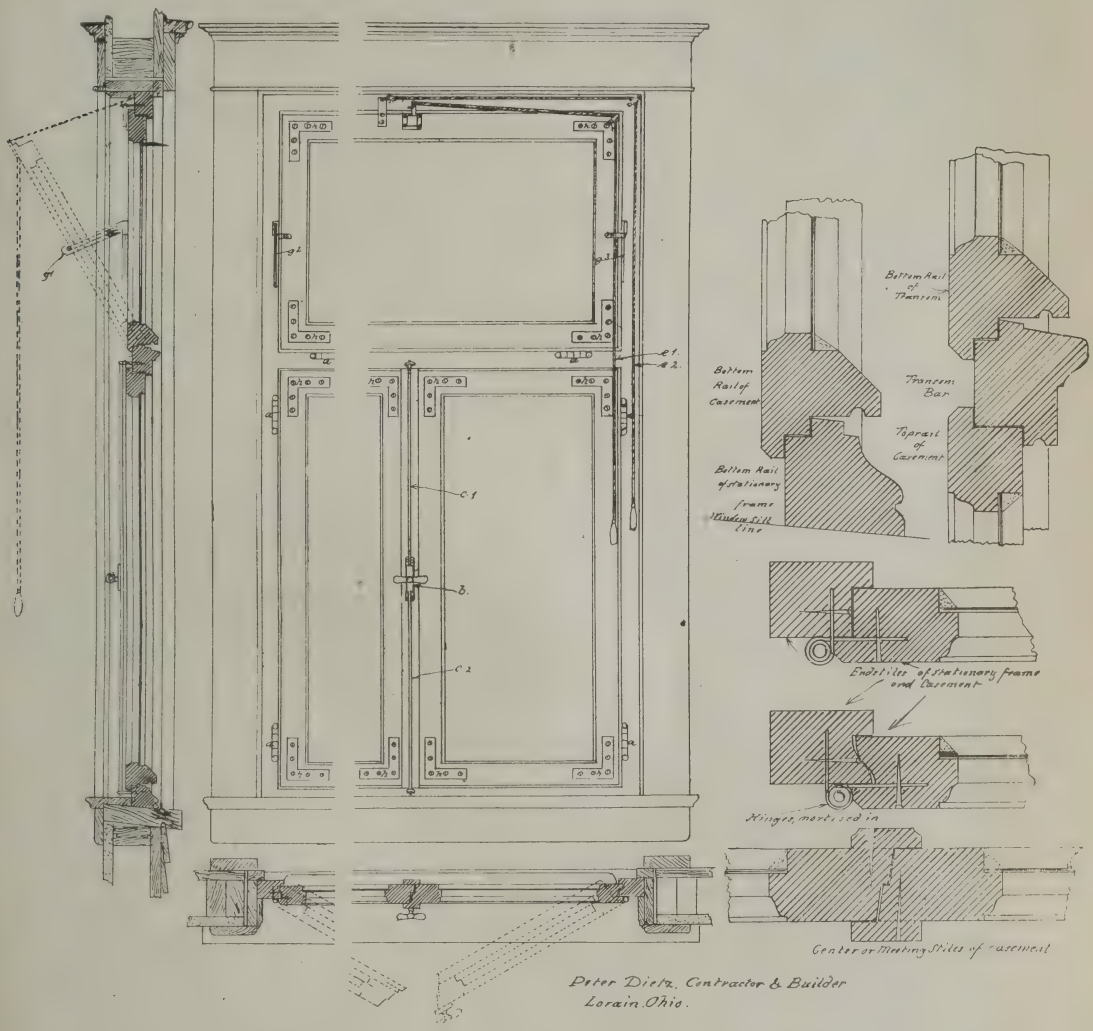
In constructing these windows, it is necessary to build an extra, I would call it, stationary frame, with the necessary rabbets worked in to receive the sash, this frame to be fitted in the window frame tight against the blind stops and fastened inside with window stops.

Of course, it is almost imperative to make the whole window in the shop, the wings and transoms fitted in and all hardware put on. It saves lots of trouble and makes a much neater and better job. All that remains to be done in the building is to put the whole window in the frame and fasten it.

The windows require some particular hardware, different from what is used in the regular sash window. In the different letters and numbers are A, the hinges. B, C1 and C2 is a so-called basquille lock, showing turn and two rods. This lock is sometimes called a cremorne or espangolette bolt; e-1 and e-2, respectively, are ropes to open and close the transom, the ropes running over little pulleys in the upper right corner. By pulling e-1 a little spring lock on top of the transom is opened, thus the transom drops open, while by pulling e-2 the transom is closed again. G-1, 2 and 3 are so-called shears, which prevent the transom from falling away down. H are angle iron screwed to the corners to prevent wings from ragging. On the details are shown the bottom rails of the lower wings and the stationary frame, and next to it the top rail of wing, transom bar and bottom rail of transom. Below this is shown how the side

stile of transom and lower wing is fitted to side stile of stationary frame. Another arrangement is shown with the hinges mortised into the stiles. It has some advantages

These windows, if properly made, are as storm proof as any window can be made without weather stripping, but they will cost a great deal more than the ordinary


Bottom Rail of Transom
Bottom Rail of Casement
Transom Bar
Top rail of Casement
Bottom Rail of stationary frame
Window Sill line
End stile of stationary frame and Casement
Hinges, mortised in
Center or Meeting Stiles of Casement
Peter Dietz, Contractor & Builder
Lorain, Ohio.

on the former, but cannot, of course, be used for transoms as shown on elevation. The lower detail shows the meeting stiles of the lower wings, with astragals fastened to each stile respectively.

windows. In some parts of the old countries, they are swung inwards, while in others they swing out, but in no case are outswinging windows permitted in first stories close to the sidewalks.

System in Mill-Work Estimates

By CHARLES CLOUKEY

SOME little time ago the discussion arose in this journal, and in some others as well, as to the practicability of architects making uniform mill-work lists and furnishing them along with the blue prints, in order that all the mills could figure on the identical items.

In a previous article I took the position that no matter who made the lists and took the responsibility for misunderstanding and error, the owner would have to pay for it in the end, and, since writing the article referred to, I have received a list of mill-work from a competent architect, covering about $3,000 worth of interior trim, and intended to be a complete bill. There are items omitted amounting to some $200, and they are clearly oversights.

This list is made out in a very unique manner, as lists go, and would scarcely appeal to the average estimator, even if it should reach him already made up. The doors, frames and trim are billed in one item for each size and style, except that they are grouped for each floor separately.

Now, the trouble with a list of this kind is that every estimator would have to analyze it, and rewrite it, and then it would be hard for the buyer to compare it with the original. Every architect would have a different system of making bills, unless they could get together and adopt something uniform in the way of routine.

And it is this very thought of routine in making mill-work lists that I wish to elaborate somewhat in this article.

It is not exactly essential that all estimators use the same sequence of items in listing mill-work, but it is a fact that there is certain routine which may prove to be more practical in a general way than some less logical arrangement of the items making up the list.

It is the practice of the best estimators to make their lists in such reliable manner that if the work is secured, the list can be turned directly into the mill and the work started as soon as may be expedient.

If the building to be furnished is small enough so that all of the mill work is put through at the same time, it would not pay to separate the list into the separate stories, but consolidate all the items possible.

Beginning with the bottom, where the builders begin, we will list all of the basement frames, giving sizes, styles and such other information as will be clear to the buyer and also be of assistance to the factory superintendent. Next we will list all of the window and door frames for the outside walls of the building. These items generally constitute the first, and sometimes the first and second delivery for the contract. Next we will list all of the windows and transoms, side lights and sash; then all of the doors, unless there are store doors to match the style of the fronts, and then all of the inside door jambs. If the jambs are to be delivered k. d., they should be billed so many "sets of jambs," but if they are to be set up in the mill, they should be billed as so many "inside door frames," and if the jambs are plain, should include the door stops. Please do not forget the inside door and window stops, for many a man has done so before you. Door stops should be billed with the jambs and window stops should be billed with the inside trim. However, we are now coming to that in our next item which should be that of window trim. It is best to bill so many sides of "window trim" of a given dimension, and this will include the casings, stool, apron, apron moulding and stops, unless the detail differs. Anyway, the estimator's list will call for so many sides of window trim and so many sides of sash trim.

Next we put down the number of sides of door trim of various sizes, and if there is more than one style, we must run our size items through each style. If our door trim calls for made up heads or trim cap, and the jambs are single rabbeted, we must list one side of the door trim 1 inch narrower than the other, and this little precaution may prevent about half of the heads being an inch too long.

A little item right here that is well worth getting into the habit, is that of closet trim, and as the plain casings and base for the closets of large buildings are quite a saving over the regular trim, the item, if permissible, should be placed directly after that of

the regular door trim. Sometimes it is the same and bunched with the trim for kitchen and pantry in residences. Sometimes there is a plain trim in the basement, and all of this style of cheap trim should appear together in the estimate.

After the openings are disposed of, we will take up the lineal foot items, including, base, of two or three members, chair rail, hook strips, picture moulding, plate rail, cornice moulding. The board measure of ceiling wainscot, scuttles, air shafts, clothes chutes, dumb waiters and in fact all the ceiling in the building. If there is a wide cornice of wood on the outside, there is apt to be a ceiling plancher there.

After the ceiling already mentioned, we may list all the stairs, and should identify them in the list by naming their location in the building if possible.

Now, we will put down all of the cupboards, china closets, mirror frames, medicine cabinets, drawer cases, shelving and all mantels and bookcases and built in seats, ingle nooks, secret closets, and any other mill work appearing upon the plans or in the lists furnished.

Some estimators have the habit of listing the outside trim, such as cornice lumber and mouldings, corner boards, porch work and steps, just after the basement frames, on account of the job calling for them in that sequence. That may be all right, but I like to have all of my frames in a bunch, and also I prefer to have all the windows and sash together, as well as all of the doors together, so that there is really no logical place to break into the list with the outside work, once the regular list is commenced. So it has become a more common practice in listing, to place the outside material either first or last in the list. In many localities, the cornice lumber and mouldings are not included in the mill-work list for estimates, as the contractor will buy these items from the lumber yard with his bill of lumber.

Every mill-work schedule should carry the items of storm sash and screens, and every estimator should be very thorough in his study of the specifications, for it sometimes happens that the bid must include storm sash and screens and this bit of information is tucked away in some unlikely place. The specification for the kind of screen wire to be used is another stumbling block which more than once has tripped up the estimator and made him drop all the profit on that part of the job.

The practical application of all this may be derived from a classified schedule of mill-work, naming the heads under which all the mill-work of any job must be separated and listed. The idea is to check each estimate against the schedule in order to determine that none of the groups have been overlooked.

Before setting out a sample of this schedule, I want to call attention to a few items of mill-work which are very apt to be overlooked in the hurry and over work which occasionally overtake the estimator.

In cases where architects are so accommodating to mark the sizes of doors and windows on the elevations as well as on the floor plans, there is little trouble or danger of leaving some of these items off the list, but some makers of plans mark the dimensions of windows only on the elevations, and the estimator naturally turns to the elevations to take off the quantities. But it sometimes happens that all of the windows do not show on the elevations given, even if there are four views given, as an inner angle of the wall or a court, or a light shaft may call for windows and still not show them on the elevations.

Another place where the number of windows is sometimes a real problem, is next to a stairway, or rather between a series of stairs and a light shaft, and no section or elevation showing the vertical location of the windows. As these windows are supposed to be located somewhere near the stair platforms, if there are any, the number may be checked in that manner, for it is very likely that the draftsman will show these windows on both floor plans when they really are between.

Windows and sash in inside walls or partitions are sometimes overlooked on account of their inconspicuous or unusual location. Mirrors in dressing room or bed room doors, medicine closets in the walls, clothes chute doors, switch case doors, astragals for folding and sliding doors, return cornices for dormers, scuttles and scuttle frames, outside and inside louvers not shown on elevations or sections, corner beads, sub-panels for porches, screens for basement windows, rear steps, and a few other items of more or less importance, are the ones most likely to be left

1. Frieze.
2. Plancier.
3. Facia.
4. Crown Moulding.
5. Bed Moulding.
6. Dentals.
7. Cornice Brackets.
8. Corner Boards.
9. Verge Boards.
10. Ridge Boards.
11. Ridge Roll.
12. Cresting.
13. Gable Ornaments.
14. Belt Courses.
15. Porch Cornice.
16. Porch Columns.
17. Porch Balustrade.
18. Balcony Balustrade.
19. Front Steps.
20. Rear Steps.
21. Side Steps.
22. Sub Porch Panels.
23. Lattice.
24. Fancy Shingles.
25. Octagon Brackets.
26. Bay Brackets.
27. Rough Form Brackets.
28. Flag Poles.
29. Pergola Porches.
30. Basement Frames.
31. Window Frames.
32. Sash Frames.
33. Door Frames.
34. Louver Frames.
35. Ventilator Frames.
36. Skylight Frames.
37. Scuttle Frames.
38. Cellar Door Frames.
39. Check Rail Windows.
40. French Windows.
41. Side Lights.
42. Plate Sash.
43. Casement Sash.
44. Pivoted Sash.
45. Art Glass Sash.
46. Obscure Glass.
47. Partition Sash.
48. Basement Sash.
49. Skylight Sash.
50. Floor Sash.
51. Conservatory Sash.
52. Storm Sash.
53. Outside Doors.
54. Panel Doors.
55. Glazed Doors.
56. Veneered Doors.
57. Mirror Doors.
58. Revolving Doors.
59. Sliding Doors.
60. Dutch Doors.
61. Water Closet Doors.
62. Cupboard Doors.
63. Clothes Chute Doors.
64. Dumb Waiter Doors.
65. Secret Doors.
66. Batten Doors.
67. Storm Doors.
68. Cellar Doors.
69. Inside Door Frames.
70. Inside Window Frames
71. Inside Sash Frames.
72. Door Trim.
73. Window Trim.
74. Sash Trim.
75. Closet Trim.
76. Three-Membered Base.
77. Two-Membered Base.
78. Closet Base.
79. Sanitary Wood Base.
80. Base Angles.
81. Floor Moulding.
82. Picture Moulding.
83. Cornice Moulding.
84. Plate Rail.
85. Plate Rail Brackets.
86. Hook Strips.
87. Chair Rail.
88. Wainscot Cap.
89. Corner Beads.
90. Astragals.
91. Thresholds.
92. Wainscoting.
93. Panel Work.
94. Colonnades.
95. Pilasters.
96. Arches.
97. Ceiling Groins.
98. Ceiling Beams.
99. Ceiling Panels.
100. Ceiling Ventilators.
101. Main Stairs.
102. Rear Stairs.
103. Attic Stairs.
104. Basement Stairs.
105. China Closets.
106. Book Cases.
107. Mantels.
108. Ingle Nooks.
109. Window Seats.
110. Wall Seats.
111. Buffets.
112. Pantry Fixtures.
113. Kitchen Fixtures.
114. Linen Closets.
115. Wardrobes.
116. Clothes Chutes.
117. Dumb Waiters.
118. Ice Boxes.
119. Medicine Cabinets.
120. Drawer Cases.
121. Closet Shelves.
122. Store Fronts.
123. Show Windows.
124. Office Partitions.
125. Corridor Partitions.
126. Toilet Room Partitions.
127. Store Shelving.
128. Store Counters.
129. Store Railings.
130. Store Tables.
131. Store Booths.
132. Gallery Nosing.
133. Gallery Balustrade.
134. Gallery Panels.
135. Platform Nosing.
136. Platform Panels.
137. Platform Balustrade.
138. Window Screens.
139. Door Screens.
140. Porch Screens.
141. Storm Porches.

off the mill-work list, and later demanded of the factory to complete the job.

While the foregoing list may not be complete, it will be a simple matter to add to it such items as may occur from time to time. And as this is a check list, it should be as complete as possible, and the items should be placed in such regular order as the estimator desires to adopt as a practice. This will help him to get them all in their proper places, and the writer has found it a good practice to leave a little blank space after each division of the list, for the purpose of inserting any check items found later.

Paint for Shingles

By A. ASHMUN KELLY

PAINT is sometimes required for shingle coating, but if I had to decide the matter it would be in the words of Punch: Don't! Paint is probably the worst coating one could apply to shingles. It is all right so far as the exposed parts are concerned; it is in the cracks between that the trouble comes, for there the paint will form little dams and hold water, which in time will rot the wood. Still, as stated, paint will be used, and hence a word as to its character and application. Let it be of a good mineral pigment, mixed with pure raw linseed oil only, with a little japan driers. Mix it quite thin—a mere priming coat—and the damming of the cracks will be greatly lessened, if not entirely avoided. It is best to use pigments that are ground in oil, for the dry pigment is too coarse for this purpose. Nor should a ready mixed paint be used, for it will likely be unfitted for this particular purpose. After mixing the paint, strain it through a fine wire sieve, which will remove any foreign particles and make the mass more perfectly incorporated. To mix it, add a little oil to the pigment at first, and work it into a smooth paste, gradually adding more oil until the mass is quite soft, and then it may be further thinned for application. The use of driers should be carefully done, as excess of this liquid will tend to injure the paint, so that it will not wear as well. Paint on shingles is in a position to suffer a great deal more from the weather and sun than where used on the sides of houses. Therefore, see that it is of the best quality and carefully mixed. Many times it will not require any driers, as in summer, in dry weather.

Shingles may be dipped in paint, just as with shingle stain, by making the paint very thin, and adding some benzine to the mixture, which will thin out the paint and make it more penetrative, while not affecting the paint, as it evaporates and leaves the oil as it was. Place the thin paint in a tub or half-barrel and tack a strip across, and as you dip the shingle draw it against the strip, which will remove excess of paint. The advantage of dipping is in the fact that all parts of the shingle are protected, and when the shingles warp apart, under the influence of the sun and wind, there will be no raw places to show through, and which unpainted parts detract very much from the appearance of a job of this kind. After the shingles have been dipped and laid they will be greatly benefited and enhanced in beauty by the application of a brush coat of the same paint-stain.

When dipping shingles throw them loosely in a pile, to dry out. It is not necessary to dip more than two-thirds the length of the shingle, or far enough to cover what is likely to show. Some remove the excess paint with a bristle paint brush.

The pigments used for shingle painting should be not only very finely ground, but transparent also. Such colors as raw and burnt sienna, raw and burnt umber, chrome green, chrome yellow, Prussian blue and drop black are useful pigments. These colors may be used alone, or in compounds, according to the color you wish. Thus umber makes a walnut shade, as does also Vandyke brown, only darker; raw sienna makes an oak color; burnt sienna makes a cherry color; a light pigment may be toned down with black or umber or Vandyke brown; Vandyke brown may be imitated by mixing together burnt umber and black. Raw sienna and a little burnt umber will give a dark oak color. Chrome yellow will lighten up chrome green, and black will tone it down. Zinc white should be used when a white is desired, because it is non-poisonous, a matter to be considered when the water is to be used for culinary purposes; sometimes the water from the roof is caught in a cistern and used. In such a case do not use any of the lead colors, such as chrome yellow, chrome green, or white lead. The earth colors, sienna, umber, Vandyke brown, and also drop, ivory and lampblack, are perfectly safe colors to use.

Colors may be blended on the roof after painting by applying two or more colors in bands like, and softly blending them with the brush. This makes some very pretty color effects, and takes very little more time. For this purpose use the paint slightly thicker.

The "Form Letter" as a Business Making Medium

By IRWIN SPEAR

CONTRACTORS and builders, when approached on the subject of advertising in one or another of its many forms, often say, "Oh yes, that is all right but it wouldn't go in the contracting business. We couldn't advertise that way."

The "form letter" is one of the mediums of advertising to which such an assertion does not apply. Any business can use letters with good results if the letters themselves are right.

Even the small carpenter shop can make letters pay and where it is desired to expand or to keep the shop busy during a dull season, letters are a most effective means to that end.

Someone has described the "form letter" as the most human advertising method and so it is provided the letters are written in a manner that makes a human appeal. In any advertising, what you say and how you say it is important. In letter advertising it is almost all-important.

It is conceivable that letters, though well-intentioned, might prove productive of more harm than good. The writer has known of such cases—not, however, in the contracting business.

When should letters be sent? This is an important question inasmuch as time is a consideration closely related to results. It is the same principle as the reception accorded the salesman who calls on a dealer to show him goods which are just then in demand and which he does not happen to have in stock.

Building is a subject which, while interesting at all seasons to people who have not as yet satisfactorily settled the home problem, is more interesting at some seasons than at others. When the days begin to lengthen and brighten and spring is in the air, the homeseeker—especially if he be a city flat dweller—turns his thoughts to suburban subdivisions where he can have elbow room, a place to keep a few chickens, perhaps, and have a garden. When a man has these thoughts in mind, the receipt of a letter on the subject of building or owning a house has an added force because it finds the person to whom it is sent in a receptive frame of mind and ready to investigate.

Letters, be they ever so well written, so compelling in subject matter, so striking in "get up," would lose much of their effect if received say the day before Christmas. At such a time the average person has the gift problem looming up before him to the exclusion of all other thoughts. The contractor's letter would therefore be most likely to find its way to the waste basket with its message rendered of no effect.

Advertising men talk a great deal about "the psychological moment" in advertising. It is certainly a factor in all advertising and a very important element in successful letter advertising.

Early spring and early fall are the times when letters will have most effect. This does not mean that contractors should send letters at no other time. A series of four letters about ten days apart beginning the middle of April and again the middle of August, would be timely.

The best time to start a letter campaign would depend somewhat on local weather conditions. If spring is generally late and winter hangs doggedly on as is the case, for instance, in Chicago, you should gauge your campaign accordingly.

What should the contractor say in his letters? That depends largely on the nature of his business and other individual circumstances that would tend to make his selling talk different from that of the other fellow.

No two businesses are exactly alike any more than two men are alike. Consequently what one contractor might say might not apply in the case of another. However, as the contracting business is essentially the same wherever found, it is possble to suggest a letter on general lines which would cover the necessary points in a telling, convincing, easily assimilable way. Here is the writer's idea of an opening gun in a letter campaign:

DEAR SIR:

Own a home.

You want to—every ambitious man does. He owes it to himself and to his family.

If you think you can't find "just the house" let us show you the complete and accurate plans we can furnish ready for building. The very thing for you—and the price is right.

Suppose we're wrong—haven't exactly what you want. We'll build to order. Draw the plans and all.

Maybe you already own a lot. Building will make it worth more and you'll have the kind of home you've dreamed of. Lack of ready cash need be no bar. We can aid you there.

Come and see. Or phone us when and where we can get you and we'll come to you. No obligation. We've a proposition that means money for you.

Which will you leave, your wife and children—a home or a bunch of rent receipts?

The same amount buys either—and in the same way, a little every month.

Don't think—ACT.

Very truly yours,

JONES CONTRACTING CO.

Such a letter might be followed up by a folder showing on the front page a cartoon of "The Man Who Didn't and the Man Who Did."

The man who did not buy one of your houses should be shown looking disconsolately at a fistful of rent receipts. The man who did buy should be shown sitting "under his own vine and fig tree," with the satisfied air of one who has something laid by for a rainy day.

A pictorial folder like this will get "under the skin" where a regular letter might not. Such folders may be printed on cardboard —XXX Embossing is the best stock—scored to fold twice or three times, with a return card attached if desired. The "copy" for the return card should be something as follows:

Jones Contracting Co., Chicago.

GENTLEMEN—We are interested in your proposition and would be glad to have particulars of how you sell homes.

Name .....

Address .....

The return of a card like this not only puts you in touch with a live prospect, but gives you or your representative assurance of a satisfactory interview. It is a leverage on sales, greater than could be obtained otherwise, since the prospect has committed himself to give you some time and attention.

Many contractors no doubt believe in form letters, and would like to use them. Their trouble is, first that they have no list and do not know how to go about to secure one. Second, they do not know what to say—how to prepare a "talk" that will tell.

Neither of these objections to the use of letters is serious. If you are located in a city, you can get in touch with concerns that make a business of furnishing lists suitable for any purpose, as for instance, lists of taxpayers, property holders, etc.

Some of these firms will also, if desired, take entire charge of the writing, addressing, printing and mailing.

The trouble with purchased lists is that they are likely to contain much "dead wood" —names of people who have died, moved away or for various reasons become ineligible as prospects.

To get the best list, compile it yourself. The names may be taken from various sources—from the telephone book, the list of those to whom marriage licenses have recently been issued, etc.

Keep these names on cards in a card cabinet. A small cabinet will do at the start. Two divisions of the list may be made: (1) Parties with whom you have had dealing, (2) prospects.

In writing a letter to go to the former, a different approach and line of argument will be used. Those who have already bought from you are familiar with your method of selling and can be approached from the standpoint of pure investment or on the basis of interesting their friends in return for which you can offer a suitable remuneration for every order secured. Point out that the building of houses either for rent or to sell will mean a better return on money than the 3 or 4 per cent paid by savings banks. Where possible, give specific instances of what some of your customers have done along these lines—facts are always more interesting than generalities, no matter how the generalities glitter.

Progressive firms who are using letters today keep close tab on results obtained, and whenever an inquiry is received or a sale made, an entry is made on the card. When a prospect becomes a customer, his card must

be transferred from the prospective division to that of those who have purchased.

Lists may also be subdivided as to classes. For instance, married young men who do not own homes might be one class. Owners of vacant property might constitute another, and savings bank depositors still another.

To each division the appeal would be different. This is the advantage of subdividing. It enables you to make your letter thoroughly appropriate.

Resultful letters are always specific. They go straight to the point like an arrow to the mark.

In sending out a letter, the most attractive appearance is obtained by using the imitation typewritten printing which is done through silk to give the exact appearance of the impression made by a typewriter ribbon. Signature cuts can be run in a different color ink and the name and address filled in on the typewriter, giving a result so strikingly like an original letter as to defy detection.

What is the secret of a "pulling" form letter? That question has been the subject for volumes and there still remains plenty to say. It is far easier to state what makes a letter fail to pull. But some letters which observe all the so-called canons of good "form" letters have not brought results, while others which seemed at first reading, perhaps, to violate some of these canons, have made splendid records of results.

Where most letter writers fail—and this is true regardless of what the business—is that the writer does not sufficiently put himself in the shoes of the man who will read it. This is not an easy thing to do, especially where you are writing about your own business. Most business men are too much interested in their own side and forget the reader's side.

The "form" letter must be thoroughly human. The story you have to tell must be so formulated that it can be quickly understood—taken in almost at a glance. Do not beat about the bush. Say what you have to say and get it over with. Use short words and not one that is unnecessary.

In most instances short letters are preferable to long ones. However, Lincoln once said that a man's legs should be long enough to reach the ground and letters are like that—they should be long enough to tell the story.

Economy

By SANFORD BUCK

THERE are so many ways to practice economy that we can only deal briefly with some of the more important ones.

The price of material, especially lumber, has made it important to watch that item very closely, and we will take this up first.

In the first place, some architects in preparing their plans waste material, or rather cause the contractor to waste it in making the work take unusual lengths. It is a well-known fact that our dimension lumber from the yards comes in lengths of even number of feet. If your architect specifies a certain reach of joists—14 feet 4 inches—as I have had it come to me, you will waste 3 1-3 feet of lumber to each 12-inch joist used, which, at the prevailing prices, would soon amount to an item not to be lost sight of in preparing an estimate.

How to utilize these necessary wastes has become, and is becoming more of a study to keen business men. It is true there are many ways in which this one waste can be utilized. These pieces I speak of, and every large contractor knows we have them, are only a sample from many on any large job. They can be cut the proper length and bevels split and make good bridging for joists, or, on frame construction, can be used for doubling corners, angles or other places where extra thickness is required.

A great many workmen are very careless in regard to material. One time I had charge of a residence that cost, when finished, $8,000. This was started when I took charge, and the material, I found, was piled, not stacked. There was no system at all; if you wanted studding, you were liable to find it under a couple of wagon loads of roof sheeting or some other place equally hard to get

to. The only thing to do was to get some laborers and have every piece stacked separately, so it could be had when needed.

On this same job, where we had just enough 2x6s of a long length for rafters, a workman wanting a piece three feet long picked up a saw and cut it off, rather than look for a piece, of which there were many. He was promptly given his time and sent off the job—a lesson to his fellows.

In commencing a building I find it good practice as soon as the ground is surveyed to lay off the foundation and plot the lot for material. The handling of the many kinds of material that goes to make up a complete job are many, and the economical handling of same is of vital importance in this age of competition.

I find it a good practice to have a way left open from street to alley, so a team and load can drive in and drop the load where you have arranged for that certain kind of material.

Have a place for your sand near the source of water supply, or convenient to building, as I have known of extra charges being made by masons, plasterers and bricklayers, on account of having needless work to do, caused by carelessness in locating their materials.

I find that for the economical handling of lumber for a medium sized building, a good way is to have a driveway near one side and pile the lumber end to the building, and each size and length separate, just like most lumber yards; in fact, for a larger building, you would have a miniature lumber yard.

I find, also, that any good foreman or working employer can make a good day's wages by watching and correcting the wastes that occur on the average building of today. This, of course, is not true in every case, but there are many chances of improvement on nearly every building you see.

Another good thing to do on any fair-sized job is to have the scraps that fall picked up every day, and those that can be used put in a pile in the building, and those that are of no further use put in some place out of the way and known as kindling. Almost any piece one foot long can be used somewhere, as well as new. Even the cast-away shingle band can be freed of the metal straps and used for furring or back lathing as good as new lumber.

I never could figure it out how some contractors could make both ends meet by having several different kinds of mechanics in a building, when it was not ready for them, as is often the case. Someone pays for this waste of time!

The matter of economy in scaffolding cannot be overlooked. Almost all frame buildings can be scaffolded more economically with fixed scaffolds, or rather scaffold brackets, for many reasons.

The material used in a nailed up scaffold on a good sized house that is wasted through splitting and breaking in taking down, with the extra time over the use of scaffold brackets, will pay for a set of brackets. These brackets can be made of scrap lumber in the winter and be ready for spring when the rush comes.

There is hardly an issue of some of the journals which reach my desk that there is not shown a cut of a house or barn unusual to the locality that does not show the wanton waste of material, in scaffold thrown about promiscuously or trampled under foot.

Experience has taught me that it is economy to buy only the best tools and keep them in proper order.

I once sent a force of eight men to a grindstone run by power, at my employer's expense for time and power, and he agreed with me that it was well spent, as shown by the amount and quality of work as the result.

There are so many places and ways in which economy over the present practices can be made that a good foreman can save his wages to his employer nearly every day, and where we are both foreman and employer, the result is worth the effort.

I venture there are not many who look back over a completed contract but will feel if they had this same job again they would have handled it differently, and with a little more forestudy, in place of so much afterstudy, would make more money and save some of the losses, which are nearly always—Lack of Economy.

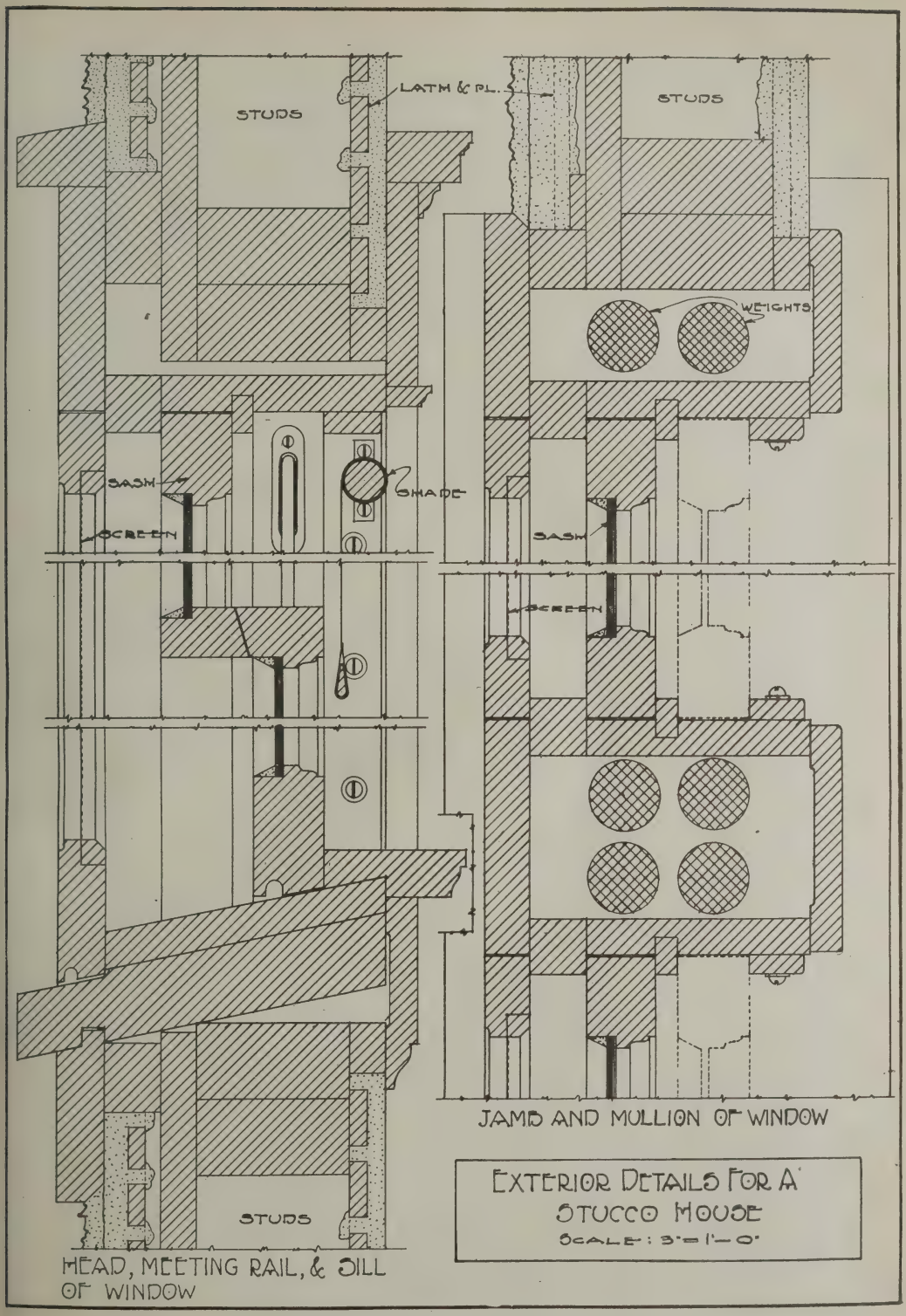
Stucco for Exteriors

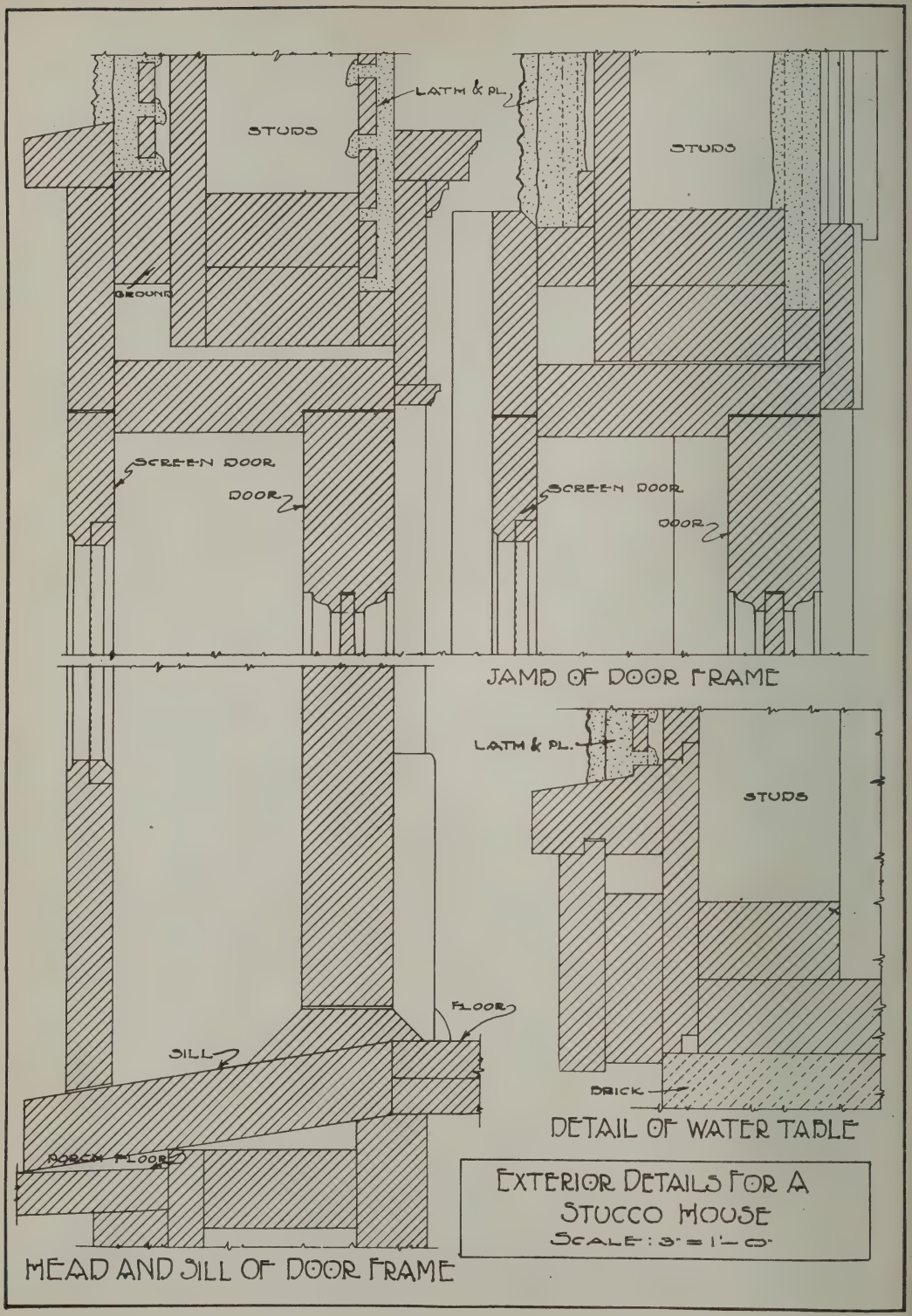
By CHARLES P. RAWSON

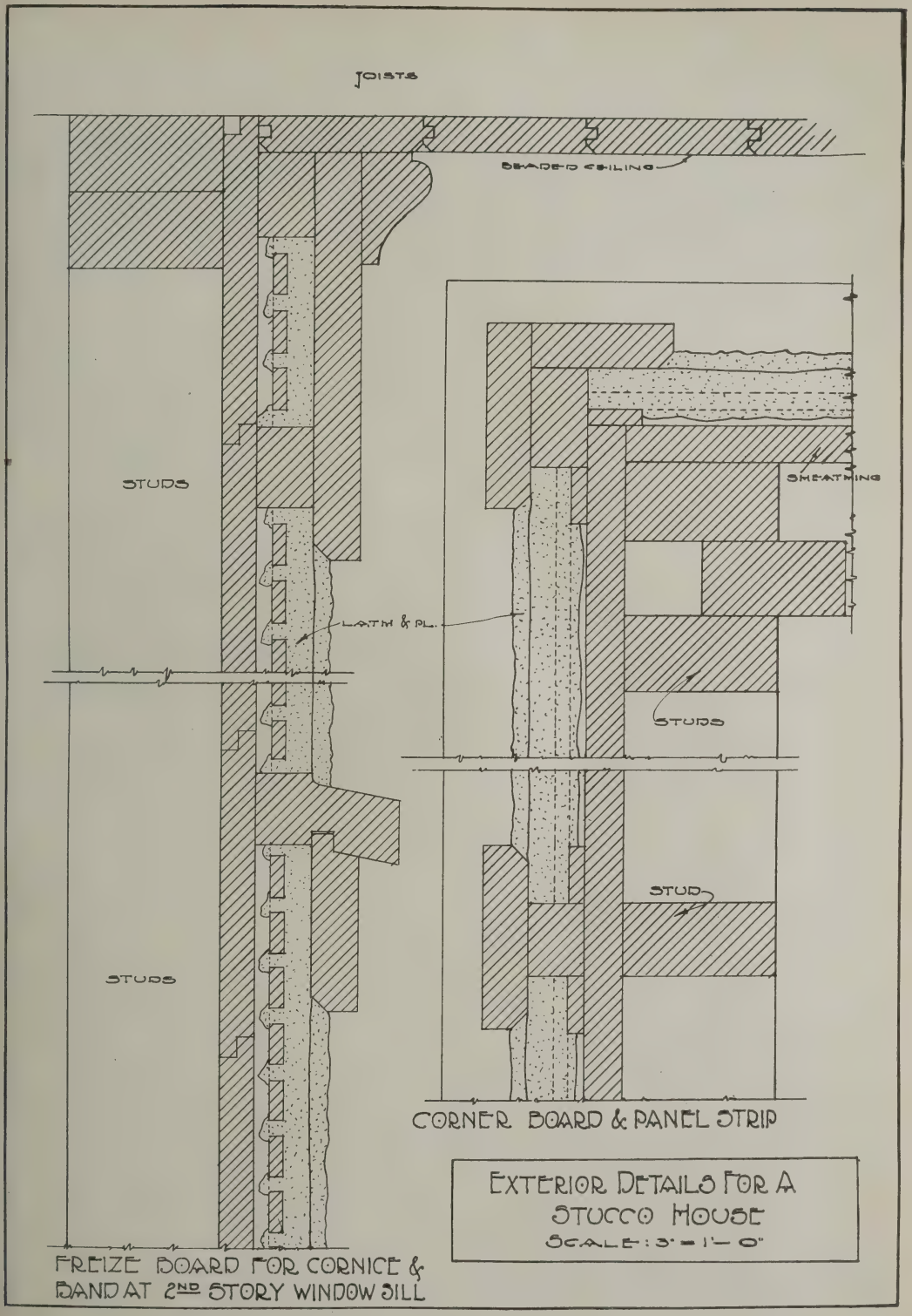
THE use of cement stucco as an exterior covering for frame houses in place of clapboards or shingles is rapidly increasing in all parts of the country, and in the smaller cities of the middle west it is becoming almost universal. For hundreds of years the architects of Italy, Belgium, England and Spain have used stucco in a most practical and artistic manner but it is only since 1895 that it has been much used in this country and it is, therefore, comparatively speaking, a new idea. The simple and attractive design of the stucco house has impressed the people and many picturesque and charming homes are now being erected. Some one may ask if dampness will not penetrate the plaster and discolor it and make the building damp; and will not the stucco crack and come off. To both of these questions, we answer, "No, providing the work is properly done." Having used this construction on a great many buildings and having observed the results under all conditions in both winter and summer it is possible to speak from experience. I am pleased, for the benefit of those who may be interested, to say that I consider a stucco covered house a drier house, one which is warmer in winter and cooler in summer, which means a saving in fuel and greater comfort. Such a building is more durable, with depreciation charges and annual repairs and painting bills reduced to a minimum, the fire risk is reduced, and the house has a greater loan value and will bring a better price in case of sale.

In a large proportion of the residence plans furnished to contractors little attention is given to the detailing of the exterior parts, such as door and window frames, water tables, bands, panel strips, etc., and the construction of these features has a great deal to do with the permanence of the stucco finish. They are usually left to the contractor, however, and if his experience is limited, the accompanying details will be of great assistance to him. They are the result of years of experience and are made to show a general type which the contractor can adapt to any stucco house. In all details shown, it will be noted that all wooden casings, bands, panel strips, etc., are put in place after the first coat or first two coats of plaster, as the case may be, are in place and before the last coat is put on. Grounds are provided at all openings and behind all strips and bands in order that the plastering may be kept true and to furnish a nailing place for the finish. This method makes a tighter job and one less liable to crack and allow the plaster to loosen.

The details on the three accompanying pages show the construction of the jamb, head and sill of window frames; the jamb, head and sill of door frames; a water table, belt course, frieze board of a cornice, corner board and panel strip. All details are drawn to the scale of three inches equals one foot, and can be accurately scaled with a rule.


STUDS
LATH & PL.
STUDS
WEIGHTS
SASH
SHADE
SCREEN
SASH
SCREEN
STUDS
HEAD, MEETING RAIL, & SILL OF WINDOW
JAMB AND MULLION OF WINDOW
EXTERIOR DETAILS FOR A STUCCO HOUSE
SCALE: 3"=1'-0"


LATH & PL.
STUDS
GROUND
SCREEN DOOR
DOOR
STUDS
SCREEN DOOR
DOOR
JAMB OF DOOR FRAME
LATH & PL.
STUDS
FLOOR
SILL
BRICK
DETAIL OF WATER TABLE
PORCH FLOOR
SILL OF DOOR FRAME
EXTERIOR DETAILS FOR A STUCCO HOUSE
SCALE: 3"=1'-0"



EXTERIOR DETAILS FOR A STUCCO HOUSE

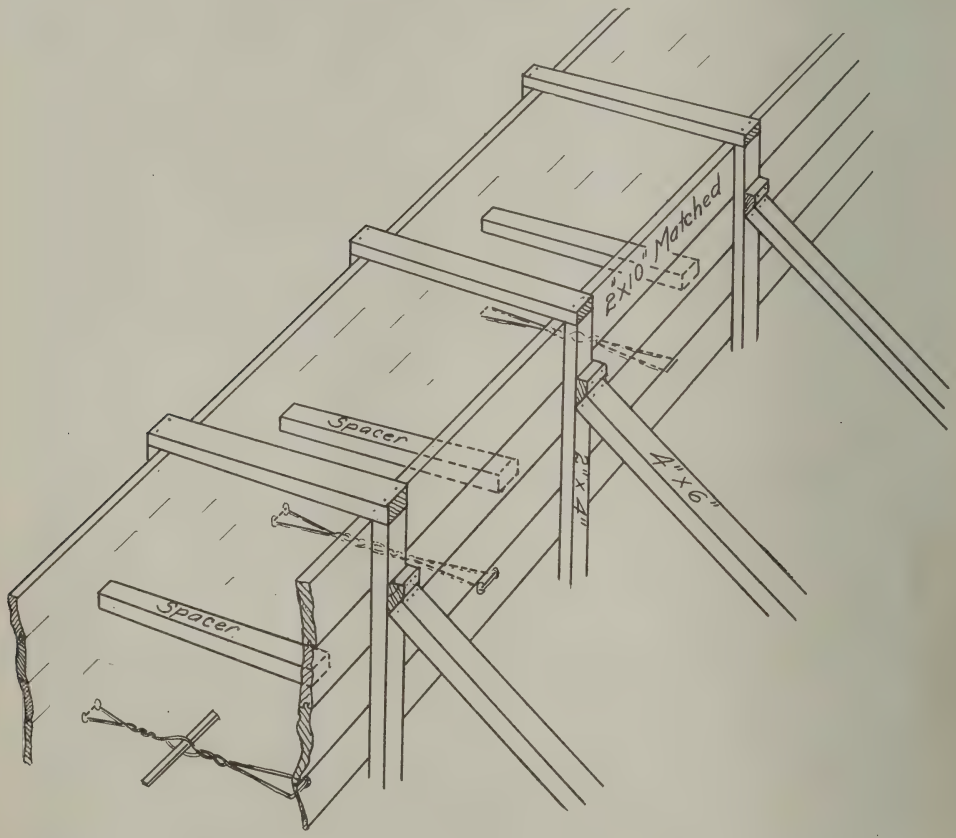
SCALE: 3" = 1'-0"

Concrete Methods

By CHAS. E. ANDERSON

THE following description of methods useful on concrete jobs are intended fundamentally to assist those who are not entirely familiar with concrete work, who find it necessary at some time or other to put in concrete, but the methods are entirely similar to those used on big work where a mixer is not conveniently at hand and have been used by the writer in putting in bridge abutments for one of the largest railroads in the east, as well as on piers and small work on rapid transit subway construction in New York City.

The materials used should of course be the best obtainable. As regards cement little can be said, since it is not the purpose of this article to advertise any particular brand. There are a number of good brands on the market, and unless the work is of some importance the reputation of the brand may be taken as a fair index of its worth. One of the chief considerations on a small job may be the rapidity with which the cement sets. Some brands set faster than others, and to sample several brands is about the best way to tell which is preferable in this respect. It is a general rule that the quickest setting cement is not the strongest, but a good brand should have an initial set in two hours in ordinary Summer weather, or, in other words, it should be hard enough to break like clay or putty. In twenty-four hours concrete made of good cement should be quite hard.

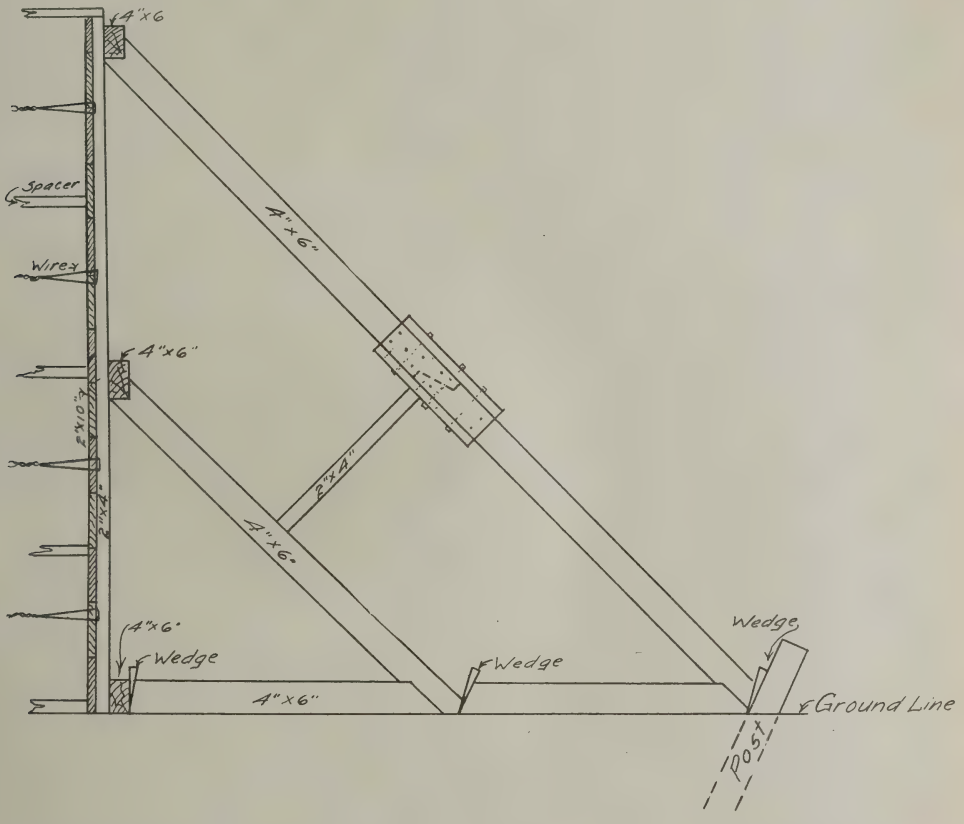


The concrete will consist, beside the cement, of either sand and broken stone or simply gravel. If broken stone is used it should preferably be small enough to pass through a three-quarter inch ring, although it is often as large as one and one-quarter

inches. The stone should be free from dust, although a small amount of finer stone is beneficial rather than detrimental, since it serves to fill the voids between the larger stone.

Limestone is not considered a good aggregate for concrete in which reinforcement is to be used, as it exerts a chemical action on the steel or iron which tends to destroy the reinforcement. The stone should be firm and hard, since the concrete can not be stronger than the weakest material contained in it.

The proper fineness of the sand to be used is rather difficult to describe understandingly. If the sand is too fine it will require a larger amount of cement to fill the voids between the grains, and will therefore weaken the concrete. If the grains are too large, the density of the concrete will be impaired. It might be said that a sand of which a half dozen grains would cover a space the size of a pin head is good sand. Following are the percentages retained on sieves of different numbers of the sand giving the best concrete when mixed with cement in proportions of one to three, as given by Bulletin No. 331, Series R, Structural Materials, 3, United States Geological Survey, the numbers of the sieves referring to the number of meshes per linear inch. Retained on No. 10 sieve, 44.4%; on No. 20, 21.4%; on No. 30, 8.5%; No. 40, 4.9%; No. 50, 3.4%; passed by No. 50, 17.4%. The percentage of voids between the grains was 37.5%. It is usual to test the sand for the percentage of loam or silt contained, it not being considered good to use sand containing much over 8% loam. To tell what percentage of loam is contained in sand put about two or three handfuls in a glass jar or bottle and fill the jar with water. Shake the jar thoroughly, so that the loam is taken up by the water, and then set it aside until it settles. The loam will be found in a thin layer on top of the sand. Measure the depth of sand and the depth of loam in several places and get the average depth of each.



Divide the depth of loam by the depth of sand. This will give the percentage of loam contained in the sand.

If gravel is used instead of broken stone and sand, it should be well graded; that is, there should be a fair variety of sizes, ranging from the sand to about 1¾-inch stones. It is better that the particles have a flat, sharp form than that they should be round, because the round particles have more voids and therefore require more cement.

The proportions used in mixing concrete are somewhat varied, and the most economical amount of cement to be used really depends on the percentage of voids between the grains of sand to be filled. In general, however, for most work a mixture of 1 part cement, 3 parts sand and 5 or 6 parts broken stone makes a good concrete. It is sometimes necessary to vary between 5 and 6 parts stone, in order to have enough sand to fill the voids and flush to the front of the forms, giving a good surface to the work, and not enough to let the stone sink to the bottom, leaving a deep slush of sand and cement on top. For extra strong work a mix of 1 part cement, 2 parts sand and 4 parts stone will give about all the strength needed. For a class of work not necessitating very strong concrete, 1 to 4 to 7 is good.

When gravel is used, the best proportions for ordinary work are about 1 part cement to 8 parts gravel.

The forms should be built of two-inch material, and as a general rule studded and braced every three feet. The bracing may be accomplished by spiking a two by four or a four by six across the sheathing and bracing it at intervals. It is preferable to have the form sheathing tongue grooved, although not absolutely necessary. If not tongue and grooved the boards will fit tighter if bevelled on one edge. If a smooth finish is desired, it is necessary to have the planks dressed one side, and in fact it is preferable on any class of work. If a smooth finish is wanted, all nail holes and cracks should be filled with soap or clay. All exposed edges on a good class of concrete should be rounded. This can be accomplished by placing in the corners of forms a quarter round concave fillet or moulding. A triangular moulding in the corners will also improve the appearance of the work, and will make corners less liable to be chipped off. Where it is not feasible to brace forms securely, heavy iron wire may be used across the inside of forms, as shown in sketch. In placing the wire two holes are bored about three inches apart on opposite sides of the forms and the wire run across the forms in two parallel lines. A stick is placed between them and the two strands twisted together until they stretch tight enough to hold the forms securely in place. The stick is then removed and the wires left in the concrete. Between the sides of the forms should be placed at intervals wooden spacers to counteract the pull of the wire and the thrust of the bracing until the concrete is poured. As the concrete reaches the height of the spacers, they should be removed, but not until the concrete is high enough to hold the side of the forms from pushing inward out of line.

In place of spacers in the forms, cement pipes may be used with bolts through the centers to hold the forms from spreading. Porcelain pipes used as wire ducts by electricians may be used as spacers, and wires run through them to hold the forms in line. Instead of wire, small rods might be used, threaded on each end, passing through the forms with a nut on each end outside of the forms. After the forms are removed the cement pipes or tubes may be cemented up. One advantage of this method is that it leaves no metal near the surface which might rust and discolor the concrete.

Dumb Waiters

By J. S. WAKELEE

The Carpenter and the Dumb Waiter. The installation of dumb waiters is not 10 per cent as frequent as it should be. Or in other words there is now one dumb waiter installed where there ought to be ten installed. Not ten like the one now in use and not ten installed as is the one. But ten good dumb waiters, properly installed.

The reason there is only one now where there ought to be ten is because the one in most cases is a poor, botched thing, a nuisance rather than a convenience, and looked upon merely as a necessary evil because it is assumed that nothing better can be had.

The contracting builder should give the subject some serious consideration as it is up to him.

There are all kinds of dumb waiters in the market, a few are good and more are no good.

A good dumb waiter poorly installed cannot give as good results as it should, and a poor dumb waiter well installed may give fair results.

The first thing the builder should do therefore is to investigate until he finds a thoroughly first-class dumb waiter as he cannot afford to bother with anything but the best. The complaints he will receive and the number of times he will be compelled to send back in the effort to satisfy his customers with an inferior dumb waiter, will not only eat up all his profits, but will cost him time and real money out of his own pocket as well, so that in the end he would have been money in if he had had nothing to do with the inferior dumb waiter, to say nothing of the annoyance and trouble and the ill feeling.

A builder who will find a good line of dumb waiters and hand power elevators and then get catalogues, blue-prints, etc., from the manufacturer, so as to become sufficiently familiar with the goods of that manufacturer so he can aid his customer in selecting the outfit best adapted to the conditions and requirements of the individual job, will not only develop a satisfactory amount of business in dumb waiters and hand power elevators in his community but will so bind his customers to him that much other business will come to him unsolicited which otherwise might go elsewhere.

There are manufacturers who do business on the principle that there is a "sucker" born every minute and "suckers" usually bite at the bait of lowest prices, consequently these manufacturers exist and make money, but they seldom do business twice with the same parties.

Another class of manufacturers proceed on the policy that each outfit sold should bring future orders. Under this policy good material, design, and workmanship are essential and time is required to develop a satisfactory amount of business, but time is speeding along anyway and the business and good will of these manufacturers becomes more valuable as the years go on.

It is only the builder who realizes the same truth and acts accordingly who prospers in the long run and who secures the respect and confidence of the community.

While these principles are not peculiar to the dumb waiter and hand power elevator business they are fundamental in the dumb waiter and hand power elevator business to an equal if not greater extent than in any other and should be clearly appreciated.

Do not buy or sell a hand power elevator or dumb waiter which is not first-class under any circumstances.

Be sure the outfit you furnish is properly installed in accordance with the blue-print and directions furnished by the maker.

Let the maker know just what your customer wants so that he can furnish the outfit complete and exactly right for the job without being rebuilt in the effort to make it do after it reaches the job. If there are any complaints or any dissatisfaction put it right back to the manufacturer. He will welcome complaints as the fault must be yours or his; if his, he will make good; if yours, he will tell you how to make good.

Brick Veneered Houses

By I. P. HICKS

SINCE everybody is more or less interested in house building, it is not unreasonable to expect that the brick veneered house has its share of advantages as well as those of other forms of construction.

A brick house has a more substantial and imposing appearance than the ordinary frame house, and is more desirable from this point of view. But the brick house with solid brick walls has its objections. All the outside walls must be furred to make a desirable job. It will not do to plaster directly

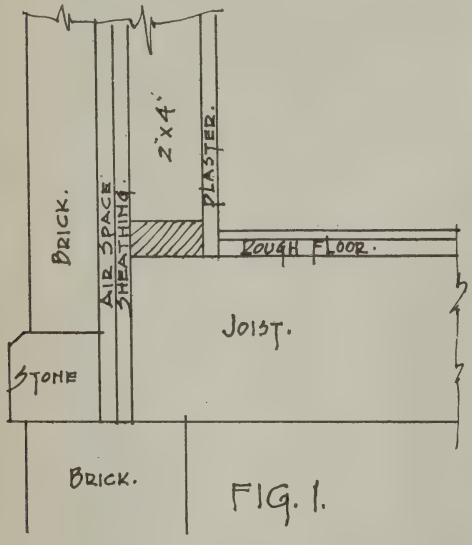


FIG. 1.

on an outside brick wall. In all such cases the brick will absorb moisture to such an extent that the plaster will remain damp and discolor for several feet above the first floor, and in some cases will even drop off. To fur a brick wall so that it can be lathed and plastered is quite a bit of labor. We think a brick veneered house is a very good substitute for a solid brick wall house, and is well worth the consideration of all who want a brick house in appearance and warmth, with the advantages of a dry house that the frame construction gives.

Anybody interested in brick veneered houses would naturally have more or less interest in the proper method of constructing them, and with this in view we have drawn up several details of construction showing the proper method of building a brick veneered house.

Figure 1 represents the outside wall of a brick veneered house. The ordinary residence needs only what is called an eight-inch solid brick wall from the bottom of cellar up to the first floor joists, as shown. We recommend that this wall have a concrete footing at least 6 inches thick and four inches wider each side than the wall above. There is nothing that makes as good a footing as concrete.

The first floor joists can rest directly on the foundation wall, then put a plate on top of the joists, and start the frame superstructure from this. The frame should be sheathed with common sheathing of the standard thickness. Between this and the brick veneering leave an inch air space. It is also a good plan to cover this sheathing with one layer of No. 2 tarred felt before laying the brick. As a matter of ornamentation a base course of stone should be run around at the bottom of the joist line as shown.

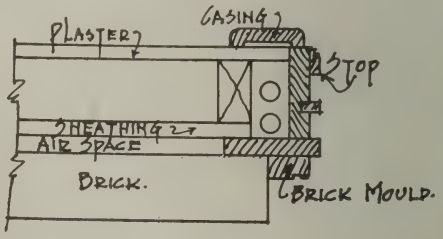


FIG. 2.

The brick veneering should be anchored to the frame by using crimped galvanized metal wall ties, one to every brick in every seventh course. The ties are nailed to the frame work and the crimped part extends out into the mortar joints.

Figure 2 represents the construction of a window frame by showing a vertical section of the same. The frame is much the same as is used in ordinary frame construction, except that where the ordinary frame has a blind stop about 1½ inches wide, the frame for the brick veneer has a casing 4½ to 5 inches wide, and it is this that forms the air space. Instead of an outside casing, the

frame has a brick mold, as will be seen by sketch.

Figure 3 represents a section through a window at the sill and also at the head, and shows all the parts in the construction in a very plain manner, so that it can be readily

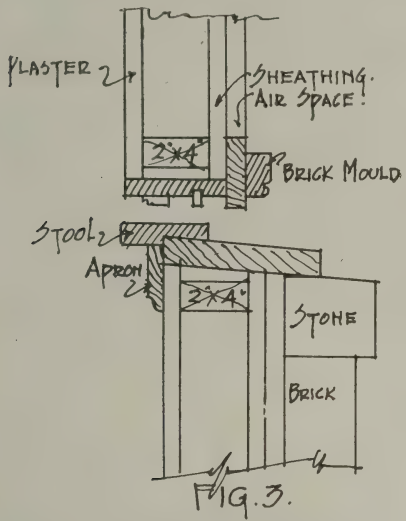


FIG. 3.

understood from the drawings without any further description.

Figure 4 represents a section of a door frame at the sill line and floor line. Figure 5 represents the side and head sections, and will be readily understood by referring to the sketches.

As the matter of cost of construction is always a very important consideration, it will be interesting to compare the cost of construction of a solid brick wall, a veneered

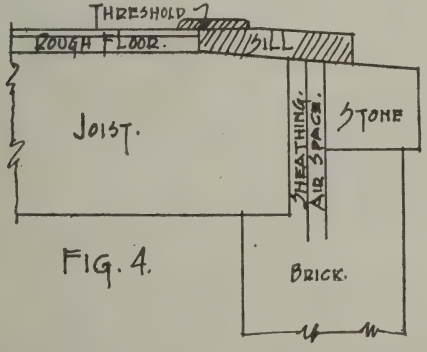


FIG. 4.

wall and an all-wood construction, to see which has the advantage in first cost. We will take a 100 square feet surface measure of each wall for example, ready for the plaster, and obtain a close approximate cost of each.

First take a solid 8-inch brick wall, faced with a fairly good face brick; the cost would be about as follows:

750 common brick laid in wall	$ 9.00
750 face brick laid in wall	15.00
Furring	1.00
Total	$25.00

Second, take the brick veneered:

100 square feet of outside wall, framed, raised and sheathed	$ 7.00
750 face brick laid in wall	18.00
Total	$25.00

Cost of all wood construction, which includes siding but not painting, would be $11. Thus, it will be seen that all wood construction is much the cheapest. There is not much difference in the solid brick 8-

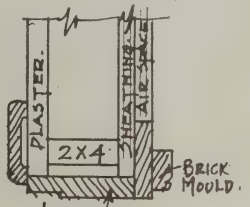
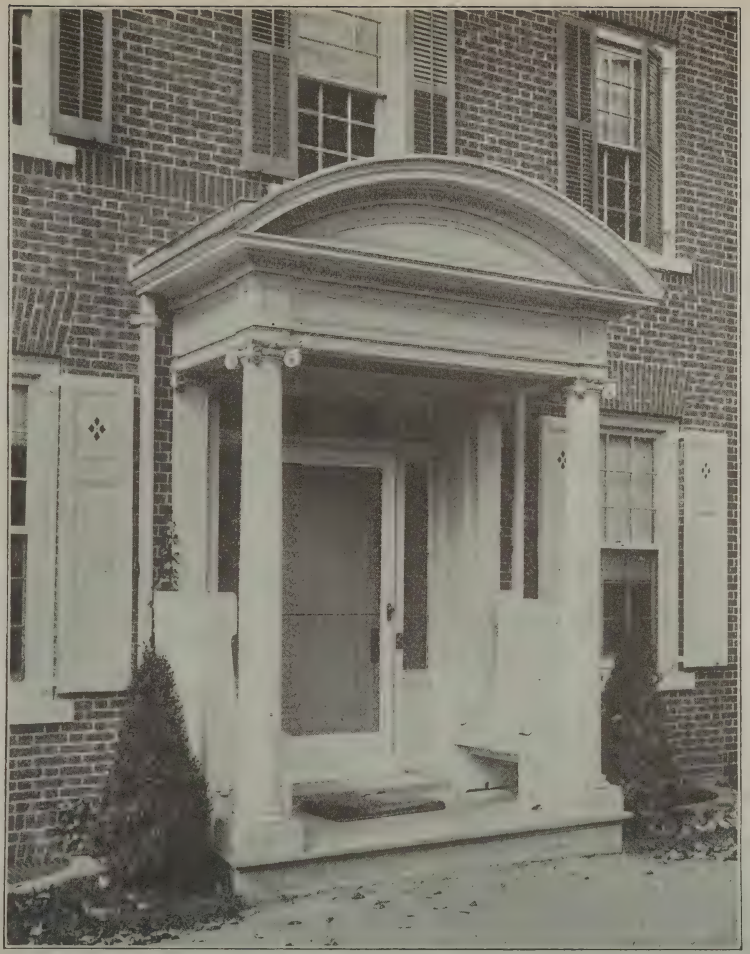


FIG. 5.

inch wall and the brick veneered wall. For veneering a frame building, we have to figure the laying of the face brick much higher on account of building scaffolds and the extra time required to lay brick in this manner. But an 8-inch wall would not do for a two-story house, and when we substitute a 12-inch solid wall for the 8-inch wall, then the cost of 100 square feet of brick wall would figure up to $33, and the cost is then much in favor of the brick veneered house.

When constructing a house of brick, be sure and select a brick that will wear well, one that will not go to pieces with age, or lose its beauty. A brick wall should be of a quality that will never need paint to cover up its defects. No painted brick wall looks good to us, and a good brick will save all trouble about exterior painting for all time to come. When we consider the dry and warm construction of the brick veneered house, we have much to commend it to the people who prefer brick construction to that of the all frame.



Doorway. Residence of J. Havemeyer, Ardsley-on-Hudson, N. Y. Delano & Aldrich, Architects.

Doorway. Studio of Mr. Henry McCarter, Bethayres, Pa. Wilson Eryre, Architect.

Doorway. Residence of Mr. Julian Codman, Hamilton, Mass. **James Purdon,** Architect.

Doorway. Residence of Mr. George Stevens, Almont, Mass. J. Lovell Little, Jr., Architect.

A Bungalow near Pasadena, Cal.

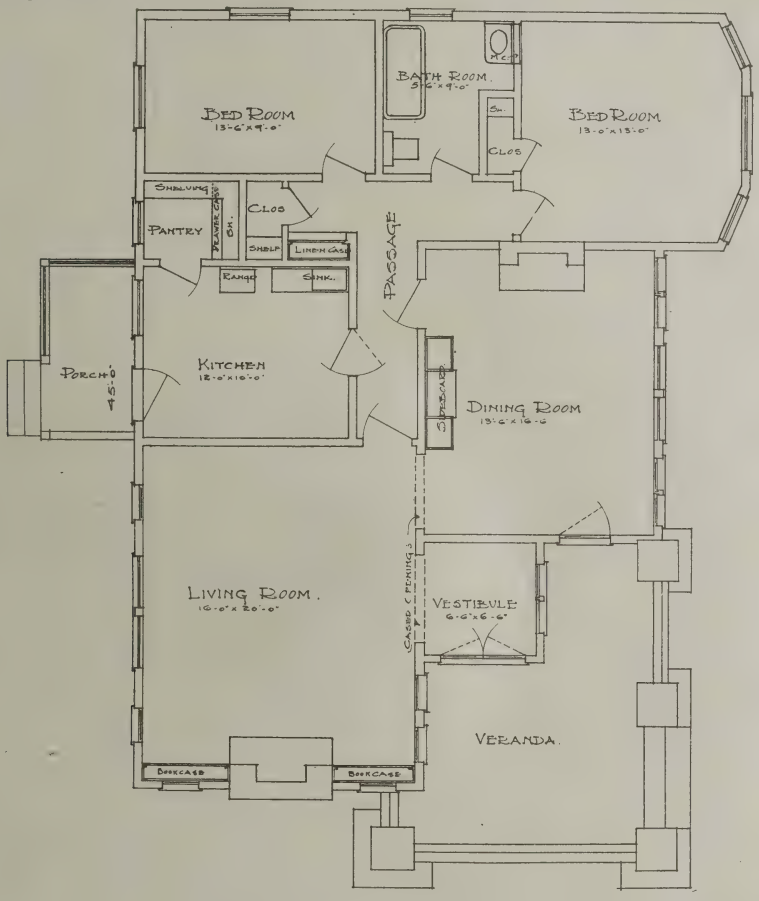
The Bungalow

While primarily designed for a warm climate and for a class of people having an abundance of more or less inefficient help, the bungalow has many excellent features.

Being on one floor, the housework resembles that of the city apartment, and the rooms all being easily reached makes them more livable. In fact, the entire bungalow is in daily use.

While some bungalows go so far as to include a den, few have anything approaching the old-fashioned parlor. The awe with which many of us, as children, saw the visitors received, is entirely lacking in the bungalow, for it seems to say, "We are all a family together, and whoever enters must be one of us."

The bungalow is of the country. Surrounded by trees and lawns, covered with vines and roses, an air of repose greets the homecomer or guest. The bungalow will not thrive in the city for the blank and bare brick walls are not, and cannot be, a part of their construction. It must stand alone, or with others of its kind, to be seen to the best advantage.



FLOOR PLAN.

Many owners, and architects and builders as well, have grieved to see the squatty appearance of their bungalow when built near higher buildings.

This bungalow belongs in the suburbs or country. The general arrangement is excellent and has proven a very comfortable home. While the slight pitch of the roof would allow the snow to lie on it, the general style is well adapted to a large section of the country, and can be modified in many details to suit individual cases.

Dining Room
Kitchen
Reception and Staircase Hall
Living Room
Verandah
First Floor Plan
Second Floor
Residence
Near Baltimore Md
E.G.W. Dietrich Architect
118 E. 28th St. N.Y.C.

"Cutting Jacks and Hip Rafters"

By JOHN UPTON

THERE is one problem or class of problems which constantly reappears in the question departments and this may mean that many of our readers are bothered by this class of work. I refer to the problem found in framing and roofs with hips, jacks and valley rafters. Such roofs are becoming more common and it is quite important that most of us should understand their construction.

Let us take for example a building 24 feet square having a hipped or pyramidal roof which rises nine feet above the plates. A common rafter in this case would be fifteen feet, that is from edge of plate to peak. But there are no common rafters in this roof unless we should put up one from the middle of the four sides, before the hips are put up. If so the first pair should be full length and the other pair shorter by half the thickness of the first pair. Then the hips would need to be shortened one and five-twelfths inches for each inch in the half thickness of the main rafters.

If the hips were put up first, the common rafters, if they were put in the middle of the plate, would be shortened one and five-twelfths inches for each inch in half the thickness of the hips. But they might not come exactly in the middle and then they would be jacks and perhaps they should be so called anyway. To get the length of the hip rafter we may first get its run by measuring across a square from 12 to 12 which gives practically 17 feet, and then measure across the square again from 17 to 9 and get 19¼ nearly.

So the entire length from plate to peak is 19 feet 3 inches, or, by figures, square the rise, 9x9 are 81, then square the run of the common rafter, 12x12 are 144. Double this and you get 288; 288 plus 81 are 369. The square root of this is 19.2 which agrees closely with the nineteen and one-fourth found by measuring across the square.

To cut the hips for the foot use 17, the run, and 9 rise. Cut on run. Use the same figures for the plumb cut at the top end, cut on rise. This applies to all hips, and valley rafters as well. Simply use 17 instead of 12 for run. Jack rafters cut the same as common ones at the foot and the down cut is the same as for common.

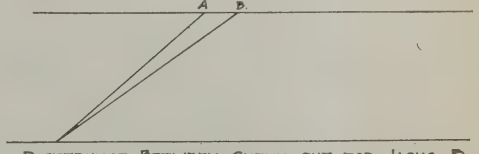
Where the most of us are apt to get bothered is in the side or cheek cuts of jacks to fit against hip, or of hips or valley rafters to fit against ridge, and the trouble is that it is so simple that we are not willing to do it easily, but try to make a hard problem of it.

Let us suppose that the work all laid down flat. Then the side cuts would all be mitres or at an angle of 45 degrees. In such a case the length and run would be equal and if used on the square would give a mitre cut. Raise the rafter up to any desired pitch and what do we get? The side of the hip is still perpendicular but a square mitre on the jack will not fit against it. But if you use figures for length and run, and cut on length, you see you are changing the cut to agree with the rise of the roof. The more rise, the more length and the more difference in the cut.

The ratio between length and run is the same for all jacks and common rafters in the same roof, so simply use length and run of common rafter, in this case 12 and 15, cut on 15. For square pitch use 12 and 17, cut on 17.

This will cut all jacks, and the side cuts of hip and valley rafters are simply run and length of the particular rafter you wish to cut. On this roof use 17 and 19¼ for the hips. Cut on length.

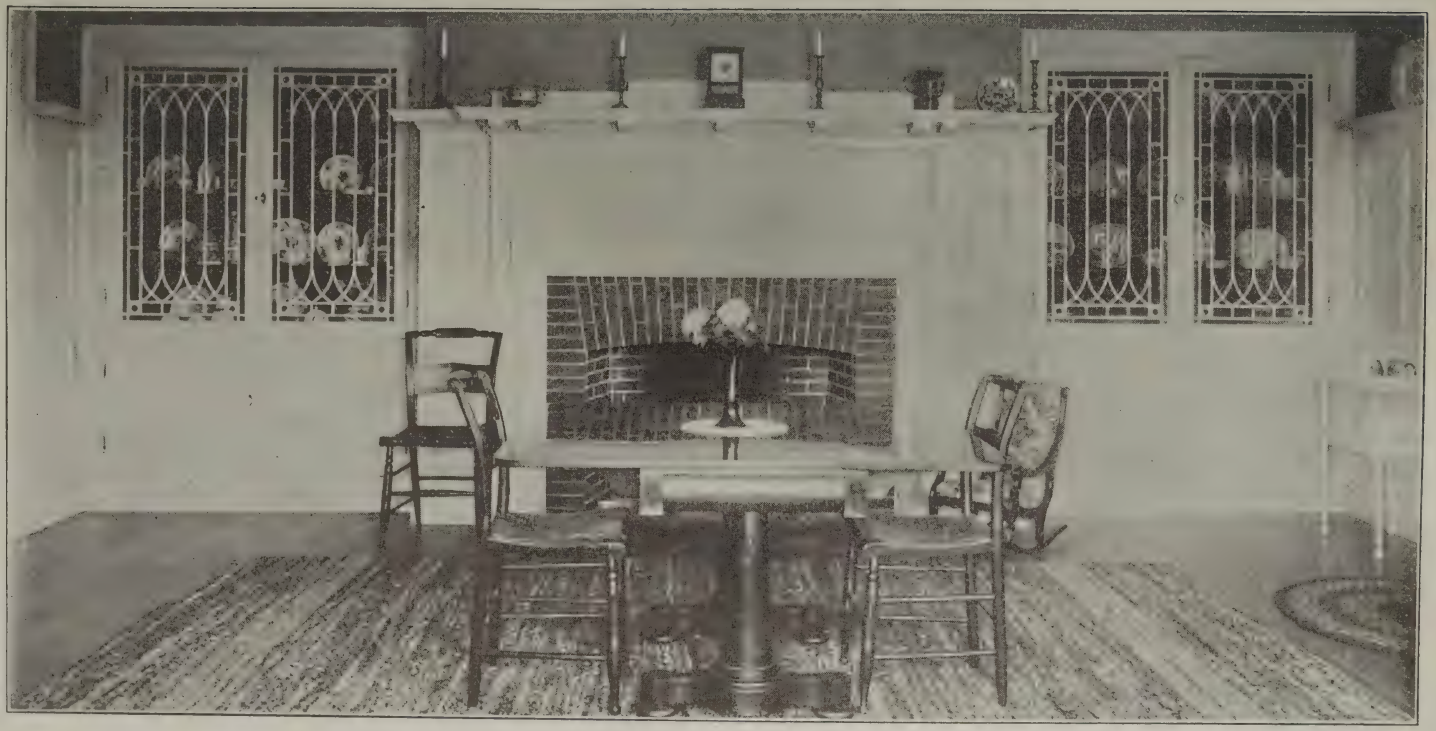
Perhaps you have seen men try to get cheek cuts for hip and valley rafters by



DIFFERENCE BETWEEN CHEEK CUT FOR JACKS B. AND FOR HIP AND VALLEYS A.

using run and length of common rafter, and while this is pretty nearly right, it is not quite. There is not very much difference, they all being, even for roofs as steep as 18-inch run to the foot, between 45 and 29 degrees.

A Colonial Interior in White and Mahogany. Simple furniture appears to best advantage here.



This Colonial Dining Room, with Pressed Brick Fireplace, is typical of many found through the early settled portions of New England.

OUR READERS PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Ed.]

Answers

ROOF PAINTING.

From "Repairer," Philadelphia, Pa.:

If carpenter's wife, Duluth, finds the roof badly perforated with pin holes, it will be best to get the whole covered with new tin or some other good roof covering. When a tin roof commences to corrode and leak, it can scarcely ever be made tight, or painted over so that it will stand for more than one or two seasons. However, if it is not convenient to put on a new roof altogether, a good heavy thick coat of red oxide paint and linseed oil, might prevent leakage for a year or so, and may be worth trying.

CORRUGATED SIDING.

From "Me Too," Pembina, Minn.:

I was "once upon a time" in the same fix as W. A. A., Volga, S. D., and cured the trouble by having a metal gutter made to hug the metal on the roof tight on the underside and the outside portion so made as to stand up an inch or so above the roof. I had the edge of roof—under the eave—plastered with cement, this cutting off all chance of snow getting under the roofing, and over the cement while soft, I nailed a fillet or batten, and I never was troubled after. Try it—you will find it O. K.

NAILING ON ARTIFICIAL PLASTER BOARD.

From "Another," Middletown, N. Y.:

As a reply to "Jack-of-All-Trades," it might be said that every man who "tackles" a job of this kind for the first time—if he is an average smart fellow—will evolve a method of his own, and in nine cases out of ten will make a much better job of the work than if he had followed any pedantic rules sent out by the manufacturer. Of course, there are conditions in materials and in the walls or ceilings to which the material is to be applied, that must be considered. One firm sends out with every shipment of material a direction card and which, with very little changes, will cover almost any of the various boards now on the market:

"The boards may be nailed directly to studding, set 16 in. from centres, or to boardings. Ceilings requiring leveling may be furred with 1/8x2-inch strips, 8 or 12 inches from the centers.

"Curved boards for covers of moderate radius require no bracketing.

"For buildings of slow-burning construction, nail boards solid to wooden surface.

"In nailing use 1¼-inch 11½ wire nails with large heads, placed 4 to 6 inches apart, and driven home firm and tight to prevent any working under the plaster coat. One keg of nails will properly apply 11,000 square feet of board.

"See that each edge has a bearing on stud or board of not less than ¾ of an inch.

"Break joints horizontally on the walls and at right angles with the beams or furred on ceilings.

"Do not wet boards before applying the plaster. Adhesion between the plastering material and the dry board is perfect.

"For first-class work we advise ¾-inch grounds."

In all cases it is better to send to the manufacturers for samples of goods, and such literature, descriptions and directions as they produce on the subject, before deciding on the kind you intend to use.

HEAVY TIMBER FRAMING.

From Wood Butcher, Chicago, answer to Carpenter, Wausau, Wis.

I don't just grasp your meaning when you say heavy timber framing, whether for dwelling or barn. Either makes a difference in construction, especially in the roof, but I will endeavor to submit a drawing that will permit changes.

I will take timber from 2x4″ to 8x8″, plenty large enough for ordinary buildings. and 2″ less than size of timber the other way for mortise being back in stick 2″. Size all timber at mortise. Bore all long tenons and mortises for 1¼″ draw pin. Make holes ⅛″ nearer shoulder in tenon than in mortise. Center of hole 2″ from shoulder is all right. One pin is 6″ or 8″ tenon. Place sills on foundation and pin them all together. The mortise for posts only need be 2″ deep, and 2″ back of face. Then they do not interfere with pins. Frame

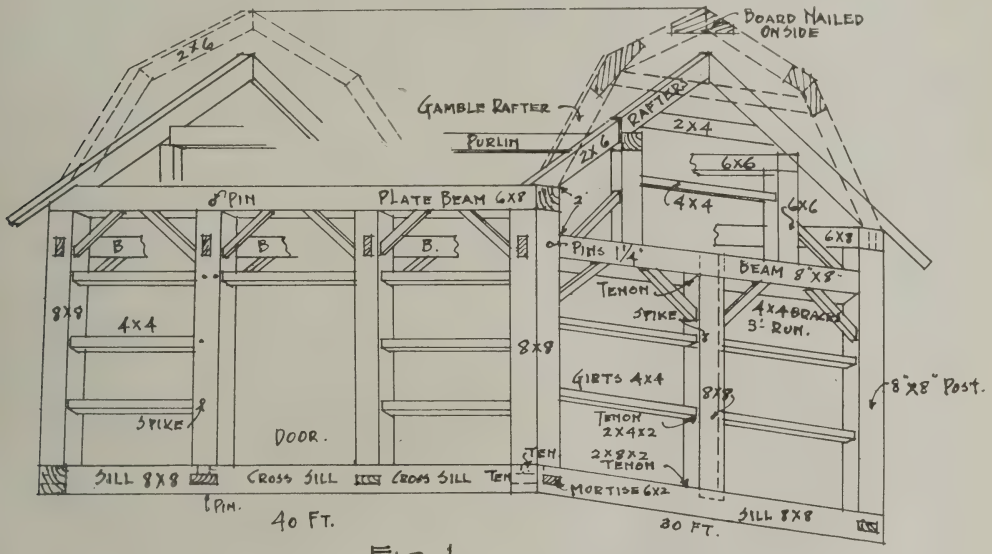


FIG. 1.

Such is framed together in bents. If you have a building 40 feet long, 4 bents will be enough, giving three spaces between them equal, or they can vary a little, according to room or timber used. Fig. 1, a corner view, but not showing much back parts, ought to give a reasonable idea. If for barn, center beams should have post under, the same size as beam. If for houses, center beams can be supported by 2x4s in partitions. Dotted lines represent gambel rafters without purloins, but the joints tied with boards for strength, and making them self supporting. Space as far apart as desired. Put on 8″ or 10″ boards, square with joint, and rip them off top of rafters. Study the end drawing for idea of putting together.

First, frame side and cross sills. See first corner. Mortise 6x2″ in middle of timber, all the bent timbers, girts and braces. Put the bents together, laying on sills, in order so you can raise the end one, and stay it up plumb. Then raise the next, and put in the side girts. Drive a spike or two in each tenon that holds the bents together, so you can do same with the rest.

After the bents are all up, put on top beams. Be sure you get the braces all in. Drive beams down and pin it, and the frame is solid. Then proceed to put up purloin posts, braces and plates, if common roof is wanted. If not, scaffold up and proceed to raise gambel rafters. Nail the side boards on all rafters solid, and when roof is all up, it is plenty strong, if the tie beams in frame are fastened well at each end. Thinking this will give the reader an idea, I will watch NATIONAL BUILDER for results.

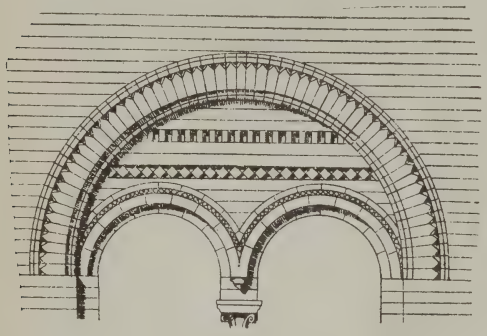
STEEL SQUARE.

From "Torontonion," Toronto, Ont.:

I would recommend J. D. V. of Elmvale to get one of Nicholl's Knock-down Squares. Another good one is made by Jennings & Co., of New York City. Either of these squares is difficult to be obtained in Canada. Better send to manufactory for square to make sure of getting one.

ARCHES.

From "Draftsman," Indian Head, Sask.: I submit herewith, for the benefit of "Beginner, Chicago," two examples of brick arches, of somewhat difficult construction,



A Semicircular Arch.

which I think will give him some excellent pointers. I would have submitted some examples of common, every-day arches, but I am sure he will find any amount of such arches in his own city, from which he can get all sorts of suggestions and pointers, as there are some very fine examples of brick

A Pointed Arch.

work in Chicago, that I know of myself. Perhaps some Chicago man will be good enough to favor our friend through these columns with a few examples of such. If not, I will take pleasure in forwarding a few more sketches next month.

[NOTE: We publish, on another page of the present number, an illustrated article on the subject of brick arches, that may prove useful to our inquiring friend.—ED.]

ACID PROOF CONCRETE SURFACE.

From "Cement Worker," Trenton, N. J.:

Acids in wines will not affect silica solution (water glass) though there are a number of other acids that will soon destroy it, if applied. Your druggist will obtain "water glass" for you or will inform you as to where you may procure it. I do not think that the water glass will taste the wine; of this, however, I am not certain. Better get expert information.

DR. GRANT'S SYSTEM OF HANDRAILING.

From "Hugh Baird," Red Deer, Alta.:

Seeing notice of Dr. Grant's book on a new method of Handrailing in your paper, I beg to submit the following, in order to give your readers an opportunity—those who may be interested in the subject—of satisfying themselves as to the value of the new, and so-called, improved method:

For many years I have been endeavoring from time to time to learn the Tangent System of railing spiral stairs. Many of my friends have been doing likewise but in each and every case it was a failure.

I have often thought that the failure was due as much or more to the system as to our incapacity.

Lately what seems to be an entirely new system has been evolved and put in book form by one Dr. Grant of Red Deer, Alta.

This work contains a criticism of the Tangent System which, if correct, explains the failure of my friends and myself.

Dr. Grant asserts that a wreath made by the Tangent System cannot possibly fit a spiral stair (that a joint end in a climbing wreath is never square, as seems to be taken for granted in the Tangent System), which fact would make it impossible for the baluster, under such a wreath, to be plumb. That the system failed was admitted by Riddell, one of its leading founders.

Dr. Grant states that the Tangent System undertook to furnish a face mould, a crooked chunk of wood, a joint on each end of the

chunk and a line on each joint to square the rail with, which Dr. Grant asserts is never square.

Dr. Grant asserts that the system failed to do any one of the things attempted, practically, and seems to prove his assertions largely from Riddell's admissions in his second edition.

It would seem advisable in the interests of workmen generally for experts to investigate and decide as to the correctness of Dr. Grant's statements. What workmen want is a correct, not an incorrect, system and this point cannot possibly be decided by the workman himself.

I hope some person qualified to do so will take this matter up and give us the facts concerning both the Tangent and Dr. Grant's System, and thus save in the aggregate, years of wasted effort.

SLATE AND TILE ROOFS.

From "Tile and Slate Roofers," Scranton, Pa.:

Replying to "Roofer of Birmingham, Ala.," I might say he would be doing a good thing for himself if he would write The United States Tile Company, Parkersburg, W. Va., and ask them to send him a copy of their "Thirty Roof Talks," which they will send free to the trade for the asking. Here are a few of the suggestions which I have taken from the little work, which will give an idea of the contents:

Your roof, above all things, should be leakproof and moisture-proof. Keep the walls and interior dry. "Dry" is the factor that establishes the durability, stability and life of a building; more—"dry" is the first aid to sanitation—health.

Your roof should be fireproof, absolutely fireproof. A fireproof roof returns a dividend every year in decreased insurance rates.

Your roof should add to the appearance of your building—add tone, zest, finish, character and completeness. The proper roof, aside from fulfilling its original mission, should emphasize every feature of the structure—bring out the lines of perspective and give a harmonious setting to the whole. Many buildings are depreciated in value simply by reason of the incongruity of their roof, when the cost would have been no more to have used the proper setting—the "touch" that harmonized.

Your roof should be of materials that have the greatest resisting qualities.

It should be unaffected by heat, cold, frost, ice, snow, hail and moisture.

It should be unharmed by climatic conditions or atmospheric changes.

It should be non-porous and a non-conductor.

Non-porous, that it will not take up moisture and "sweat" on the underside, creating dampness and decay.

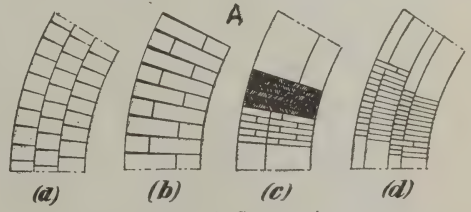
Non-conductor, that it may not transmit the heat of summer or the chill of winter to the interior. The attic should be as cold in summer as the reception hall, and this is possible.

Your roof should possess all the qualities of utility, stability and durability, with the added graces of attractiveness, harmony and symmetry, without fault or defect; satisfactory from every standpoint—real merit—real money's worth.

I would say something of slate, but I think I have taken space enough already. I may take up slate next month, but the pamphlet I ask you to send for, will probably serve your purpose.

BRICK ARCH CONSTRUCTION.

There are a number of ways in which brick arch rings may be constructed, and the several methods are shown in Figure A at (a), (b), (c) and (d). The selection of the method to be used in the construction of such arches depends principally upon the span of the arch, and, consequently, the depth of the arch ring. At (a) is shown an efficient method for securing an arch ring



Brick Arch Construction.

in brick, which is known as the rowlock arch. As will be observed from the sketch, the arch is in a number of concentric rings, each composed of header bricks. The advantage in an arch constructed in this manner is that good workmanship is easily secured, that special bricks are not required, that the

radial joints between the bricks are broken and are reduced to a minimum thickness at the extrados end of each course, and that the horizontal joints of the sheeting of the arch are broken, and the bricks are so arranged that a 4-in. toothing is always secured. The disadvantages of such an arch exist in the fact that its appearance is not all that could be desired, and that it is considered that there is a lack of unison in the action of the several rings, and consequently one ring of the arch is likely to carry more than its portion of the load. In good rowlock arches, however, laid up in Portland cement mortar, this last disadvantage is hardly reasonably taken.

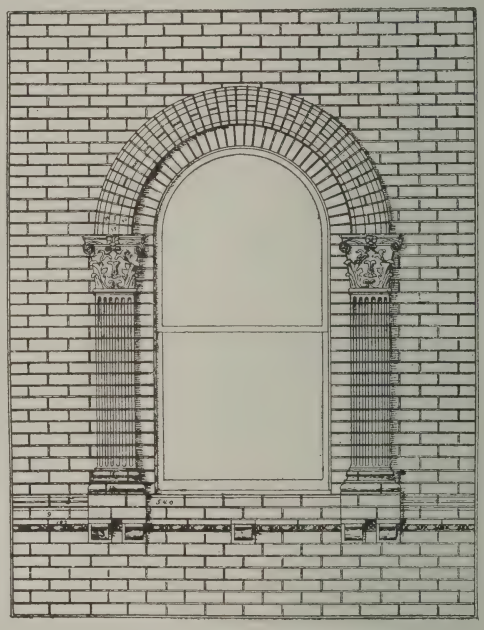
At (b) the arch construction is known as the header and stretcher bond. This ring, as will be observed, is composed of radial joints which extend from the intrados to the extrados, the depth of the arch being made up with headers and stretchers. With such an arch wide joints are obtained at the extrados, and when the arch is of small span and considerable depth the spread joints become unsightly. The structural disadvantages of such joints exists in the fact that the mortar, especially when it has not obtained its final set, will compress more readily at the extrados of the arch than at the intrados, so that undue stress is created at the edges of the brick adjacent to the intrados of the arch. This construction provides a bond radially across the arch ring, as well as longitudinally or parallel with the direction of the soffit of the arch.

The arch is frequently constructed by driving slate into the joints at the extrados, and thus obtaining a bearing at this point independent of the mortar. This, at best, is a makeshift method, and can hardly be recommended.

With gauged brick—that is, brick tapered to form—this arch presents excellent constructive features as well as good appearance.

In the Figure A at (c) is shown a brick arch constructed by method known as the "block in bond" course. This is probably the best and most practical form of brick arch for large spans in engineering works. By means of this system of bonding, a bond in all directions is secured. It will be noticed that this method of bonding consists essentially in the building up of independent voussoirs of stretcher bricks interposed between segments of headers and stretchers, each segment usually being divided into two portions, so as to break the two joints. This type of arch construction is particularly adapted for heavy pressure, and should be carefully laid in Portland cement.

Another type of bonding for brick arch rings which has met with favor is that shown in the figure at (d). This type of construc-



Design for An Arched Window.

tion has been used for arches of 30 feet and 40 feet spans, and consists essentially of concentric rings composed of headers and stretchers. with frequent interposition of a through stretcher course, in order to provide bonds between the rings.

STEP, AND OTHER SCROLLS.

From "Red-Hand," Duluth, Minn.:

In answer to Student, submit the following, which I think is much more suitable to his wants and much more simple than the method sent you by "Stairbuilder" for the February number of the BUILDER, though that was very good, even if old, and difficult to follow and adapt. The method I show is quite simple and can be easily followed:

The volute is not easy to draw freehand, anyway, but to construct it with compasses is quite a simple matter.

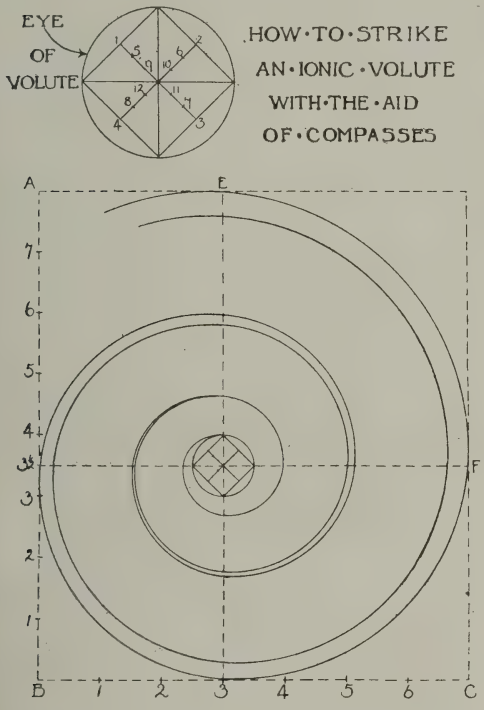
Having ascertained the height A B, divide

it into eight equal parts, as shown in the diagram in this column.

Then draw the base line B C, and set off thereon seven parts equal to those on A B.

Through 3 draw the vertical line 3 E, and midway between 3 and 4 on A B, draw the horizontal line 3½ F.

The intersection of these two gives the center of the eye of the volute. The eye itself is one part in diameter. It is drawn to a larger scale in the diagram, to show how to obtain the various centers from which to



strike the volute or scroll itself. With center I and distance 1E draw as far as the point F. Then from point 2, reducing the radius, continue the curve, and so on from the points 3, 4 and up to 12.

If the inner line is also necessary, work backwards for the inner spiral from where the double line commences, taking the center at ¼ distance from 8 12. Then continue with center at ¼ distance 7, 11 and so on.

There are other methods of drawing this scroll, but the above is the simplest of them. The original of the Ionic capital has been the subject of many learned discussions, some competent critics believing that the form was borrowed from early goldsmiths' work. I give a sketch of this, that readers may see how very closely allied the forms are. Another, and perhaps more logical theory is that shown by the three rough sketches, Fig. 2. First the rectangular block of stone was

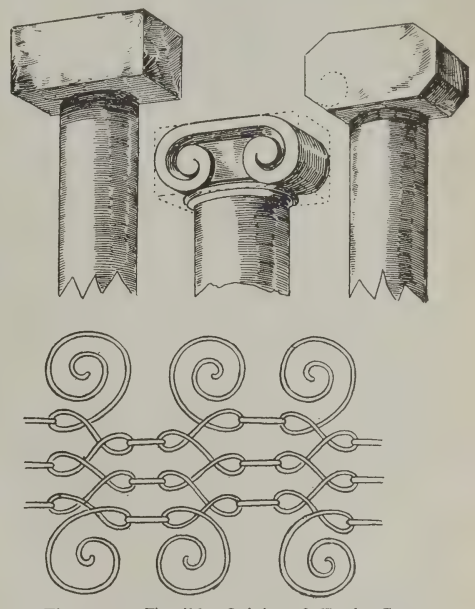


Figure 2. Possible Origin of Tonic Caps.

placed on the round column, later the scroll was suggested to the builders by the taking off of the sharp angles, and then continuing the line thus obtained.

Questions

THE TEN-FOOT POLE VS. TAPE-LINE.

From "Subscriber," Nelson, British Columbia:

Which, in the opinion of your readers, is the better to use in framing heavy timber—a wooden ten-foot pole, or a steel-ribbon tape-line? Out in this northwestern country, I have noticed—in two instances—the framer making use of the steel tape-line. When asked the reason why—I was told the latter was "so much handier, could be carried in a pocket, and could not be tampered with." As I about to frame a number of large buildings, of timber, I would like to adopt the most up-to-date methods, hence my inquiry.

SMALL APARTMENT HOUSE.

From "Builder," Dayton, Ohio:

I am in search of plans and elevations

suitable for an apartment house, six stories and a basement, to be built on a lot 25 by 100 long, plain and not too expensive. Must have modern plumbing and steam heating. Will be grateful for information or suggestions.

FRAMING BRACES WITH UNEVEN RUNS.

From "Big Boy," Nelson, B. C.

I can lay out braces in framed work for all kinds of square or equal runs, but when it comes to framing braces having unequal "runs," I run against a snag, and have not yet got around it. I know there is a method for getting the length and cuts for braces having unequal runs, and our framing boss knows it, but he will not show the "boys" how it is done. He tells us we are "too fresh," and that we want to know too much. Will some one kindly explain how to lay out a brace having, say, 3 ft. run on the girt, and 4 ft. run on the post, or say, 3 ft. 6 in. on the girt and 4 ft. 6 in. on the post, or vice versa? This, of course, is to be done with the steel square.

EXPANDED METAL.

From "Inquirer," South Bend, Ind.:

Please explain the term "expanded metal," and why it is employed, and you will oblige an old subscriber.

From I. K. S., New Cumberland:

I have been a reader of the NATIONAL BUILDER for most two years and have seen nothing within its columns relating to hitches made with rope or the manner in which they can be spliced.

I would be thankful to any brother reader of the NATIONAL BUILDER to show through its columns the different ways a rope can be tied and also a good substantial way to splice them.

From C. E. R., Columbus, O., answering Contractor Zimmerman's article:

I think it very good, but I do not agree that all men can adapt themselves to accomplish the same results. I am a hardwood floor worker or rather contractor. I mean the veneer floor 3/8 of an inch thick. I could not follow building in this place as the contractors figure work too close for me. I want margin enough so that there is some chance of satisfying customers without losing money on the transaction.

From J. A. J., Bieber, Cal.:

I have been a reader of THE NATIONAL BUILDER for three years, and like it very much. Don't want to do without it.

Will some of the practical readers of THE NATIONAL BUILDER please give me some help on the following questions?

Will 2x4 yellow pine floor hoist for a residence 7-foot span, 24 inches on centers, be strong enough? Give me an answer to this question in solution, so I may see how it is worked, how much load per square foot should be allowed for floors.

Will concrete stand sufficient heat to be used in a boiler furnace? What proportions should the mixture be made? When sand and gravel is taken from a creek bottom, should it be sifted and mixed again, or is it good practice to use it as it comes from the creek?

Why are terra cotta linings used in brick flues?

What kind of paint should be used on an engine which has been through a fire?

How do you cut rake mouldings, to mitre with the horizontal?

What is the difference between a sill and a girth?

Is it practical to back hip rafters?

Where can I find a book of plans of small school houses?

Would like to see some articles on jacketed stoves for schoolrooms.

Would like to see some articles on the proportioning of different parts of a building.

Would like to see some articles on casement windows, that would make it plain to one who never saw a casement window.

MORTAR.

From "J. McD.," Duluth, Minn.:

How long a time should mortar be allowed to remain in its bed, or box, after being made, before it will be fit to use?

GARAGE.

From "Contractor," Germantown, Pa.:

Some useful information is required regarding "garages," their surroundings, requirements and fittings. Such information —at length—will be appreciated by one who has several of such buildings to erect and complete, including outside arrangements.

A Colonial Country Home.

Table of Concrete Footings, showing Safe Loads, Sizes, Number and Spacing of Rods, etc., for Square and Round Columns.

Size of Column	Safe Load in Pounds	Top	4 Tons per ft				3 Tons per ft				2 Tons per ft.				1 Ton per ft.				Thickness W
			W Bottom	Rods Size	Rods No.	Rods Spacing	W Bottom	Rods Size	Rods No.	Rods Spacing	W Bottom	Rods Size	Rods No.	Rods Spacing	W Bottom	Rods Size	Rods No.	Rods Spacing	
6"×6"	36,000	18½"×18½"	2'0"×2'0"				2'6"×2'6"				2'10"×2'10"				4'0"×4'0"	½"	14	7"	
8"×8"	64,000	22½"×22½"	2'8"×2'8"				3'0"×3'0"	½"	12	7"	3'9"×3'9"	½"	14	7"	5'5"×5'5"	"	18	"	
10"×10"	100,000	26½"×26½"	3'4"×3'4"	½"	12	7"	3'10"×3'10"	"	14	"	4'10"×4'10"	"	18	"	6'9"×6'9"	⅝"	24	"	
10"×18"	180,000	29½"×37½"	4'2"×4'10"	"	17	"	4'10"×5'6"	"	17	"	6'5"×7'1"	⅝"	23	"	8'8"×9'4"	"	31	"	
12"×12"	144,000	30½"×30½"	4'0"×4'0"	"	16	"	4'7"×4'7"	"	16	"	5'8"×5'8"	"	22	"	8'1"×8'1"	¾"	28	"	
12×20"	240,000	33½"×41½"	4'11"×5'7"	⅝"	19	"	5'8"×6'4"	⅝"	21	"	7'1"×7'9"	¾"	25	"	10'1"×10'9"	⅞"	37	"	
14"×14"	196,000	34½"×34½"	4'9"×4'9"	"	18	"	5'6"×5'6"	"	20	"	6'8"×6'8"	"	24	"	9'6"×9'6"	"	32	"	
14"×22"	308,000	38"×46"	5'8"×6'4"	"	21	"	6'6"×7'2"	¾"	27	"	8'1"×8'9"	"	29	"	11'6"×12'2"	"	41	"	
16"×16"	256,000	38"×38"	5'6"×5'6"	"	20	"	6'3"×6'3"	"	26	"	7'8"×7'8"	"	28	"	10'10"×10'10"	"	38	"	
16"×24"	384,000	42"×50"	6'5"×7'1"	¾"	23	"	7'5"×8'1"	"	29	"	9'1"×9'9"	⅞"	33	"	12'11"×13'7"	"	47	"	
18"×18"	324,000	43"×43"	6'2"×6'2"	"	22	"	7'0"×7'0"	"	28	"	8'8"×8'8"	"	30	"	12'3"×12'3"	"	42	"	
18"×26"	468,000	46"×54"	7'1"×7'9"	"	25	"	8'4"×9'0"	⅞"	31	"	10'4"×11'0"	"	35	"	14'4"×15'0"	"	51	"	
Round Columns.																			
5½"	33,000	18	2'0"				2'5"				3'1"	½"	12	7"	4'4"	½"	16	7"	
7½"	44,000	20	2'5"				2'9"				3'6"	"	14	"	5'0"	"	18	"	
9½"	70,800	23	3'2"	½"	14	7	3'7"	½"	14	7	4'6"	"	16	"	6'4"	⅝"	22	"	
11½"	103,800	27	3'9"	"	"	"	4'5"	"	16	"	5'5"	⅝"	20	"	7'8"	¾"	26	"	

Size of Column	Safe Load in Pounds	Top	4 Tons per ft				3 Tons per ft				2 Tons per ft				1 Ton per ft.				Thickness W
			W Bottom	Rods Size	Rods No.	Rods Spacing	W Bottom	Rods Size	Rods No.	Rods Spacing	W Bottom	Rods Size	Rods No.	Rods Spacing	W Bottom	Rods Size	Rods No.	Rods Spacing	
6×6	28,500	17"×17"	1'10"×1'10"				2'2"×2'2"				2'8"×2'8"				3'8"×3'8"	½"	12	9"	
8×8	51,200	20½"×20½"	2'6"×2'6"				2'11"×2'11"				3'6"×3'6"	½"	10	9"	4'11"×4'11"	⅝"	14	"	
10×10	80,000	24½"×24½"	3'2"×3'2"	½"	8	9"	3'8"×3'8"	½"	10	9"	4'4"×4'4"	"	12	"	6'1"×6'1"	"	18	"	
10×18	145,000	27×35	3'10"×4'6"	"	11	"	4'6"×5'2"	⅝"	13	"	5'6"×6'2"	⅞"	17	"	7'10"×8'6"	⅞"	21	"	
12×12	115,200	28×28	3'10"×3'10"	"	10	"	4'5"×4'5"	"	12	"	5'5"×5'5"	"	16	"	7'5"×7'5"	"	20	"	
12×20	192,000	30½"×38½"	4'8"×5'4"	⅝"	13	"	5'3"×5'11"	¾"	17	"	6'5"×7'1"	"	19	"	8'10"×9'6"	"	23	"	
14×14	156,500	31½"×31½"	4'6"×4'6"	"	12	"	5'3"×5'3"	"	16	"	6'2"×6'2"	"	18	"	8'6"×8'6"	"	22	"	
14×22	246,400	34×42	5'4"×6'0"	¾"	15	"	6'1"×6'9"	⅞"	19	"	7'5"×8'1"	1"	21	"	10'5"×11'1"	1"	29	"	
16×16	240,500	38×38	5'6"×5'6"	"	14	"	6'3"×6'3"	"	18	"	7'7"×7'7"	⅞"	20	"	10'7"×10'7"	1⅛"	26	"	
16×24	307,200	38×46	5'11"×6'7"	"	17	"	6'10"×7'6"	"	21	"	8'4"×9'0"	1"	23	"	11'8"×12'4"	"	31	"	
18×18	259,200	39½"×39½"	5'8"×5'8"	"	16	"	6'6"×6'6"	"	20	"	7'10"×7'10"	"	22	"	11'0"×11'0"	"	30	"	
18×26	374,400	42"×50"	6'8"×7'4"	⅞"	19	"	7'7"×8'3"	1"	23	"	9'2"×9'10"	1⅛"	25	"	13'0"×13'8"	1½"	35	"	
Round Columns.																			
5½"	26,400	17"	2'0"				2'3"				2'8"				3'9"	½"	10	10	
7½"	35,200	19	2'3"				2'6"				3'2"	½"	10	10	4'5"	"	14	"	
9½"	56,640	21½"	2'9"				3'3"	½"	10	10	4'0"	"	12	"	5'7"	⅝"	16	"	
11½"	83,040	25	3'3"	½"	10	10	4'0"	"	12	"	4'9"	"	14	"	6'9"	¾"	20	"	

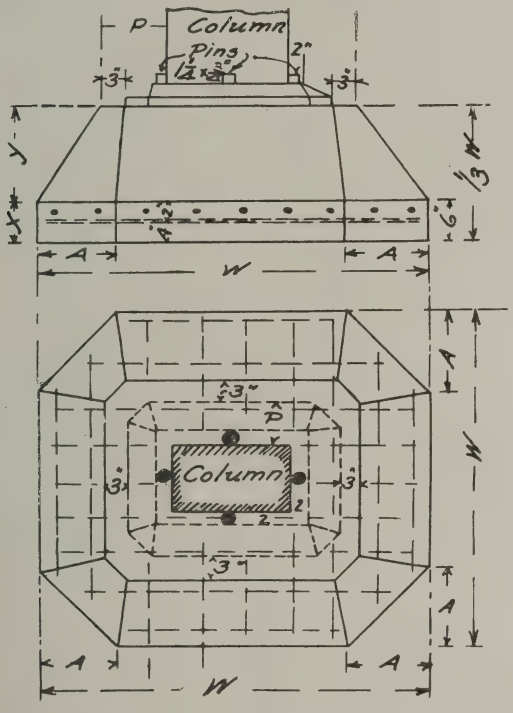
Safe Load in Pounds	Top	4 Tons per ft				3 Tons per ft				2 Tons per ft.				1 Ton per ft.				Thickness W
		W. Bottom	Rods Size	Rods No.	Rods Spacing	W. Bottom	Rods Size	Rods No.	Rods Spacing	W. Bottom	Rods Size	Rods No.	Rods Spacing	W. Bottom	Rods Size	Rods No.	Rods Spacing	
25,200	17"×17"	1'9"×1'9"				2'0"×2'0"				2'6"×2'6"				3'5"×3'5"	½"	10	10	
44,800	20"×20"	2'5"×2'5"				2'9"×2'9"				3'3"×3'3"	½"	8	10"	4'6"×4'6"	⅝"	12	"	
70000	23½"×23½"	3'0"×3'0"	½"	8	10	3'5"×3'5"	½"	10	10	4'2"×4'2"	⅝"	10	"	5'8"×5'8"	"	14	"	
126,000	24×32	3'8"×4'4"	⅝"	11	"	4'3"×4'11"	⅝"	13	"	5'2"×5'10"	¾"	15	"	7'4"×8'0"	1"	18	9	
100.800	26½"×26½"	3'7"×3'7"	"	10	"	4'0"×4'0"	"	12	"	4'10"×4'10"	"	14	"	6'10"×6'10"	"	16	10	
168.000	28½"×36½"	4'3"×4'11"	¾"	13	"	4'11"×5'7"	¾"	15	"	6'0"×6'8"	⅞"	17	"	8'6"×9'2"	1½"	21	"	
137.200	30×30	4'2"×4'2"	⅝"	12	"	4'9"×4'9"	"	14	"	5'9"×5'9"	"	16	"	8'0"×8'0"	"	22	"	
215.200	31½"×39½"	5'0"×5'8"	⅞"	15	"	5'8"×6'4"	"	17	"	6'2"×6'10"	"	19	"	9'8"×10'4"	"	25	"	
175.200	33½"×33½"	4'9"×4'9"	¾"	14	"	5'5"×5'5"	"	16	"	6'6"×6'6"	1"	18	"	9'0"×9'0"	"	24	"	
268.800	37"×45"	5'7"×6'3"	⅞"	17	"	6'5"×7'1"	⅞"	19	"	8'4"×9'0"	1½"	21	"	10'11"×11'7"	1⅝"	27	"	
246.500	39"×39"	5'6"×5'6"	¾"	16	"	6'2"×6'2"	"	18	"	7'8"×7'8"	"	20	"	10'8"×10'8"	"	26	"	
327.600	39½"×47½"	6'2"×6'10"	1"	19	"	7'1"×7'9"	1"	21	"	8'6"×9'2"	"	21	"	12'1"×12'9"	"	29	"	
Round Columns.																		
23,100	16"	1'8"				2'0"				2'6"				3'6"	⅝"	8	10	
30,800	17½"	2'1"				2'7"				3'0"	⅝"	8	10	4'2"	¾"	10	"	
49,560	20½"	2'7"				3'1"	½"	8	10	3'8"	⅝"	10	"	5'4"	⅞"	12	"	
72.600	23½"	3'2"	½"	8	10	3'8"	⅝"	10	"	4'6"	¾"	12	"	6'5"	1"	14	"	

Builders' Reference Tables

By A. J. ROBINSON

COLUMN FOOTINGS.

Footings of all kinds, in this age of cement, are laid in concrete, and usually reinforced with twisted steel rods, which have been used in this work as the simplest and most readily reinforcement available. The detail shows the footings for all loads in the



range of general practice on soils, the safe carrying capacity of which is from one to four tons per square foot of surface. Column footings, in order to equalize the settlement, between column and wall footings, should have a spread of about 10% less than the wall footings; the best way to do this is to add 10% to the bearing capacity of the soil.

Desired: The size of a footing supporting a load of 100,000 lbs., on soil capable of carrying four tons of 2,000 lbs. per square foot; 4 tons equal 8,000 lbs. plus 10% equals 8,800 lbs., divided into 100,000 lbs. equals 11.37 ft. plus the angle 128 in. or 89/100 of a foot equals 12¼ square feet or 3 ft. 4½ in. x 3 ft. 4½ in. on the bottom, and should be built as shown in the detail; the thickness in all cases will be one-third the greatest width of the bottom. Note 1/3 of 3 ft. 4½ in. is 14 in., or may be made any height desired; but one-third the height is ample for strength. If desired, the footings may be made with full corners. The above described footing 3 ft. 4 in. x 3 ft. 4 in. square. The footings in this work are designed for any building up to and inclusive five stories, and are also designed to carry the full live and dead loads supported by the column above. The reason for this is that the general practice throughout the country, and all building laws, require wall footings to be not less than 6 in. wider on each side of the wall next above; as this makes the wall footings for the class of buidings under consideration the full live and dead loads and are equal with the column footings.

(Larger buildings will be considered in the near future.)

Except a wall footing resting on soil, the bearing value of one or two tons per square foot, it would then be well to compute the wall footing.

In computing the loads for a wall footing, the following weights should be considered:

Brick work .....120 lbs. per cu. ft.
Stone work of all kinds.165 lbs. per cu. ft.
Concrete, with crushed stone or gravel .....150 lbs. per cu. ft.
Concrete, with cinders..120 lbs. per cu. ft.
or as may be prescribed by local building laws.

The method of computing the loads are the same as for column, except one foot in length of wall, with one foot width of the floors and roof, from the center of the span, are used as the load on each running foot of the footing.

Building Restrictions in Business Property Deeds

By ELTON T. BUCKLEY

THE following letter brings a subject forward which I have been expecting to discuss for some time:

Chicago, Ill., March 15, 1912.

Elton J. Buckley, Esq.

Dear Sir:—I am in the wholesale and jobbing business in the city and would appreciate your opinion as to my legal status under a clause in my deed which I have just gotten into trouble over. About eight years ago I purchased my store property, and have recently begun to erect a small brick building on the rear, to use as an office and sample room. My neighbor on one side is threatening to go to law to prevent me from doing so, on the ground that my deed contains a provision that no building must be erected upon the rear thirty feet of my lot. He takes the position that the building I propose to build there will cut off his light and air. When I purchased the property I was told that this clause was obsolete. Should like your opinion on the subject.

Respectfully yours,

JAMES PERLEY & Co.

The subject of building restrictions in deeds is one which touches in a vital point the uses to which one's property can be put, and when one is buying real estate no deed should be accepted without the most careful scrutiny and consideration of any restriction which may be found there. Particularly is this so with real estate bought for business purposes, for the reason that the needs of growing business may be seriously interfered with by some building restriction which was regarded as of slight importance at the time of purchase. I have known several such cases where the property with the restriction enforced became actually unsuited to the business.

Generally speaking, building restrictions limit the use of a property, in that the whole or a certain portion of the premises must be used only in a specified manner; or that no business whatever can be carried on there; or that certain businesses which are described cannot be carried on there; or that the buildings erected shall be within certain limits of size, or shall cover only certain portions of the lot; or that no "offensive businesses" shall be carried on; or that only buildings of a certain cost shall be erected.

Building restrictions usually arise when the original owner of a large tract divides it into sections, and puts into each deed, as he sells his parcels off, some restriction which is intended to work to the benefit of all the other tracts. Such restrictions can be preserved indefinitely as long as each deed, when the properties are sold, contains the same wording. Suppose, however, that one of the sections passes from hand to hand, as the years go by, and finally passes into the hands of A. A sells it to B, but neglects to have the building restriction put in the deed. B takes the property free from the restriction, and so does everybody who comes after B.

The law does not favor building restrictions, because they fetter the free use of real estate, which the law doesn't like. That is why building restrictions are upset, whenever the court can find a good reason to do it.

I have dug out of the leading cases on the subject several examples of building restrictions in order to show how the courts have construed them:

A restriction forbidding the erection of "any livery stable, slaughter house, glue factory, etc., or any other manufactory, trade or business which might be offensive to the neighboring inhabitants," one court held was broken by keeping a coal yard on the place.

The owner of another property the deed of which contained a restriction "against the erection of any building in which should be conducted the trade of a butcher or any nauseous or offensive trade whatever, or for any purpose which shall tend to disturb the quiet or comfort of the neighborhood," opened a grocery store. A neighbor took him into court for an alleged violation of the restriction, but the court said a grocery store was not a violation.

Still another restriction named certain trades which must not be carried on, and then added "cow stables, or hog pens, or any other dangerous, noxious, unwholesome or offensive establishment, trade or calling, or business whatsoever." The owner opened a

livery stable and was upheld by the court, in the lawsuit that followed, as to his right to do so.

There are many cases where building restrictions have forbidden the sale of liquor. They have almost always been upheld.

In one very interesting case some peculiar individual, for undisclosed reasons, sold a property with a restriction in the deed that the business of wholesale or retail confectioner should never be carried on there. A grocer finally got possession of the property, and put in certain kinds of candy, which a neighbor attacked in court on the ground that it violated the restriction. The court said that the grocer was not pursuing the business of wholesale or retail confectioner, and so was not violating the restriction.

In a case where the restriction forbade carrying on the trade of a butcher, the court held that this was broken by selling raw meat on the premises, even though no meat was slaughtered. The case hinged on the meaning of the word butcher, and the court held that a man who sold meat was as much of a butcher as he who killed it.

In several cases a restriction forbidding the conduct of any business on the premises was upheld. Think of the predicament that decision left the owner who had carelessly overlooked that provision in his deed.

A building restriction is usually enforced by injunction, the court issuing an order forbidding the owner of the restricted real estate from violating his restriction. However, where the injury which the neighbor may have suffered can be compensated by damages, the court will often refuse the injunction and give damages in its place.

Generally speaking, there are three good excuses for violating a building restriction: First, the neighbor who is now objecting waited too long to make his complaint. This is what the law calls laches; an example of it would exist if Perley & Co.'s neighbor should stand by without complaint and see them erect their brick back building and should then ask the court to tear it down.

Second, general acquiescence. This arises where a number of adjoining properties, all subject to the same building restriction, should by common consent disregard it.

Third, change in the neighborhood, rendering the building restriction unnecessary and removing the cause. As for instance, where adjoining properties were originally residence properties, and the original owner of the tract of which they were a part created a restriction forbidding buildings on the rear portions of the lots. This to give them all a breathing space. The neighborhood becomes a business section, and there is no longer need of the breathing space. Under such circumstances the court will almost always declare the restriction obsolete and unnecessary and refuse to uphold it.

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Elton J. Buckley.)

The Personal Appearance of the Small Contractor

By T. E. HAYES

(Submitted in our recent contest.)

THE personal appearance of the small contractor is of vital importance to his business in these days of keen competition. Of course, a contractor generally builds the houses for his nearest friends, whether they are related to him or not, but we do not have to dress in broadcloth to get this work as they are our friends and they trust us. But building houses, etc., for personal friends does not usually keep a man busy in the contracting business, and so we have to look out for other customers. The small contractor, I take to mean the one that employs not more than twelve men, often not more than six.

The man with ability and intelligence enough to take contracts enough to keep six men busy ought not to find any difficulty in letting any one who comes on the job see that he is the Boss, even though he be dressed in overalls and has a nail apron on. Then, too, one finds it so much more convenient to wear overalls. I have been in the business in a town of 12,000 population for the last seven years and have always found it pays better to wear overalls on the job. In these days of competition, the small contractor cannot always get a price big enough so that he can get a fair income out of the work of six men. He finds it necessary to lay out the work for masons, and then if he wishes to get the best results from his carpenters, he will mark out all openings, because he knows the blue prints so much better than the men (he has studied them closely in making his estimate). He will save time and money if he helps to lay out the openings for the stairs. They must be right and he must know that they are right before the plasterer gets to work. Then, he should see that every scaffold is perfectly safe and give personal help in framing the roof. He can do all of these things much better if he is in overalls.

In all my experience, I have never found it to pay to use other men's tools. I always take my tool chest on every job and try to have plenty of tools of the best quality I know of and keep them bright and sharp. It sets a good example to your workmen if you keep your tools sharp. I have very seldom had to tell one of my men to file a saw or sharpen any tool. There are several stages in a building when the contractor can get away to look after other contracts, and these should be taken advantage of. Then the overalls can be left on the job. I have never found it inconvenient to be in overalls when the owner or his wife came on the building. No man ever needs to be afraid that his overalls will be objected to by the people who employ small contractors. The architect does not object; your business is quite different from his. I have known a number of small contractors who have been too fine for overalls. I can't recall many of them that have made a success of the business and kept their credit good.

I would say to the small contractor, if you wish to be successful in business, help your men with all the most particular work. If you have any superior knowledge, do not keep it all to yourself. You will have better workmen if you will impart some of your intelligence to them, and generally they will try to give you pointers in return. Never keep a man who is too big for his job—it doesn't pay. Do good work even if you do not make so much profit. The people the small contractor works for can often only build one house in a lifetime, and then it takes the best part of their lives to save the money to pay for it, so do a good job. There are other things in this world we can enjoy as well as money. It means that you can meet the man you built for ten years hence and not have to go down some back alley to evade him. It means making a reputation for good work and that means plenty of it, even in the leanest years, and our business will not suffer in the least because we have our overalls on. After seven years' success in business, I find no reason to discard my overalls—they seem part of the job.

Keep the building as free as possible from muss. It makes a good impression. Be as smart as you can and no one will ever ask who is the Boss if they see you, even in overalls. I put my money every time on

THE BOSS IN OVERALLS.

Workmen's Compensation Laws

By W. J. STANTON

In nearly every country in Europe a system of compensation for industrial accidents has been generally adopted which has taken the place of the old common law methods of compensation for injuries. Statistics which have been compiled within the last few years show that from 40 to 70 per cent of the accidents which occur in industry are traceable neither to the fault of the employer nor to the negligence of the employe, but that such percentage of the injuries is due entirely to the inevitable and inherent hazard of the trade.

The right of the employe in proper cases to recover damages from his employer for personal injury received by the employe in the course of his employment has existed for many years at common law. Some 300 years ago the courts adopted the doctrine of *respondent superior,* which extended the liability of the employer for such personal injury to the negligent acts of the employer's agents and servants. This general common law right of the employe existed at the time of the adoption of the constitution of the United States, and until very recently no other method of legal compensation for personal injuries has been known to American law. The legislature of Illinois provided, by statute enacted in 1874, four years after the adoption of the present state constitution, that "the common law of England, so far as the same is applicable, and of a general nature, and all statutes or acts of the British Parliament, made in aid thereof and to supply the defects of the common law * * * and which are of a general nature, and not local to that kingdom, shall be the rule of decision and shall be considered of full force until repealed by legislature authority."

In the absence of a constitutional amendment, a compulsory workmen's compensation law in the state of Illinois, or in any other state in the Union, must find its justification in the general police power of the state, to the reasonable exercise of which all constitutional provisions are subject. It is well settled that police power is one of the incidents of sovereignty which neither the national nor state constitution has granted away or limited, and that it inheres in the state as well as in the federal government and cannot be bartered or contracted away. It thus becomes important to inquire just what is meant by the term "police power," Judge Cooley, in his constitutional limitations describes it as follows:

"The police power of a state in a comprehensive sense embraces its whole system of internal regulation, by which the state seeks not only to preserve the public order and to prevent offenses against the state, but also to establish for the intercourse of citizens those rules of good manners and good neighborhood which are calculated to prevent a conflict of rights and to insure to each the uninterrupted enjoyment of his own, so far as is reasonably consistent with a like enjoyment of rights by others."

California, Illinois, Kansas, Massachusetts, Michigan, Nevada, New Hampshire, New Jersey, Ohio, Washington and Wisconsin all passed elective workmen's compensation or insurance laws in 1911. The first to receive the court test was that of New York, whose law was passed in 1910. This act provided compulsory compensation in eight classes of hazardous trades when the injury resulted from "a necessary risk or danger of the employment or one inherent in the nature thereof, or failure of the employer * * * or any of his or its officers, agents or employes to exercise due care, or to comply with any law affecting such employment." The court of appeals held that the law was unconstitutional. The court was of the opinion that the legislature had power to modify or abolish the fellow servant rule and the rule of contributory negligence, and, to a limited extent to regulate the application of the doctrine of assumed risk. It sustained the classification of employments under the act, but held the law unconstitutional as depriving an employer of his property without due process of law, and declared that the law imposing an absolute liability upon employers in certain occupations for injuries sustained by employes, though lately the fault of the latter (except when such fault showed serious and wilful conduct) and without any fault of the employer though engaged in a proper occupation per se, was not sustainable as a proper exercise of the state's police power.

The Senate of Massachusetts had under consideration an elective system of compensation, with a feature providing for the incorporation of mutual associations of employers to insure the payment of the compensation provided in the act, a system based upon the German system of Trade Associations. This act was presented to the supreme judicial court of Massachusetts for an opinion as to whether or not it was in conformity with the provisions of the Massachusetts constitution. The opinion of the justices, rendered under the constitutional provisions of that state requiring the court to advise the legislature when so requested, was to the effect that the proposed act was constitutional. The court said: "There is nothing in the act which compels an employer to become a subscriber to the association, or which compels any employe to waive his right of action at common law and accept the compensation provided for in the act. In this respect the act differs wholly so far as the employer is concerned from the New York statute above referred to. By subscribing to the association an employer voluntarily agrees to be bound by the provisions of the act. The same is true of an employe who does not choose to stand upon his common law rights. An employer who does not subscribe to the association retains his common law rights to set up the defense of contributory negligence or assumption of the risk, or to show that the injury was caused by the negligence of a fellow servant. In the case of an employe who does not accept the compensation provided for by the act and whose employer had become a subscriber to the association, an action no longer can be maintained for death under the employers' liability act. But these considerations do not constitute legal compulsion or a deprivation of fundamental rights."

In New Hampshire an elective law was passed, limited to certain dangerous employments, the rate of compensation being fixed in some respects on a lower scale than that adopted in Massachusetts. In Ohio the act created a State Liability Board of Awards to administer state insurance funds raised from premiums paid jointly by employers and employes, ninety per cent of which should be paid by the employer and ten per cent by the employes. Employers failing to pay premiums are deprived of the defenses of the fellow-servant rule, assumption of risk and contributory negligence. The schedule of compensation is based upon two-thirds of the loss of earning power. The Ohio act has been upheld by the supreme court of that state. Kansas passed an act providing for an elective plan upon a schedule of compensation similar to that of Illinois, and made the law applicable to railways, factories, mines and employments in which the risk to life and limb of the workmen is inherent, necessary or substantially unavailable. In Nevada an act was passed which applies to workmen engaged in certain specified extraordinarily hazardous occupations. The act embodies the doctrine of comparative negligence, and the compensation is on a basis of sixty per cent of the average weekly earnings. In California an elective plan is in operation, and the common law defenses are abolished or modified. The comparative negligence theory is recognized. The schedule of compensation is in advance of that of Massachusetts and New York.

The workmen's compensation law of the state of Washington contains several features not embodied in the laws of other states. Its law is compulsory as to extra hazardous work, although employers and employes engaged in other work may jointly elect to accept its provisions. The employer is required to contribute to an accident fund a sum equal to a certain specified percentage of his pay roll, according to a schedule of rates set forth in the law, which varies according to the hazard of the industry. This fund is in the hands of the state treasurer. Each class of employers is liable for the injuries occurring in that class and that class alone. The amounts payable into the accident fund are computed on the current cost plan. If an employer defaults in payment to the fund, the amount due is collected by an action at law in the name of the state. This law was upheld by the state supreme court. The Wisconsin law abolished the common law defenses of assumption of risk and the fellow servant rule, and is made elective as to employers having four or more employes. The compensation is fixed and scale having a maximum of $3.00, but is based upon 65 per cent of the average weekly earnings. The election of the employer is made by filing a statement with the Industrial Accident Board, and when he has accepted the compensation act his employes are presumed to have also accepted it unless con-

trary notice is given. The Supreme Court of Wisconsin sustained the act.

The Illinois act (Senate Bill No. 283, approved June 10, effective May 1, 1912, laws of Illinois 1911, page 315) is elective and provides for the abolition of the fellow servant rule, assumed risk and contributory negligence (except as it may be considered in reduction of damages) by those employers electing to pay damages under the provisions of the act. Every employer is presumed to have elected to pay compensation for damages under the provisions of the act until notice in writing of his intention to the contrary is filed with the State Bureau of Labor Statistics. The same provision applies to the employes, unless they shall give notice to the contrary, in which event the employer is not deprived of his common law or statutory defenses. The class of employers covered is very broad and includes those "engaged in the building, maintaining or demolishing of any structure; in any construction or electrical work; in the business of carriage by land or water and loading and unloading in connection therewith" (except those engaged in interstate commerce); "in operating general or terminal store-houses; in mining, surface mining or quarrying; in any enterprise or branch thereof in which explosive materials are manufactured, handled or used in dangerous quantities; in any enterprise wherein molten metal or injurious gases or vapors or inflammable fluids are manufactured, used, generated, stored or conveyed in dangerous quantities, in any enterprise in which statutory regulations are now or shall hereafter be imposed for the guarding, using or the placing of machinery or appliances, or for the protection and safeguarding of the employees therein, each of which employments is hereby determined to be specially dangerous in which from the nature, conditions and means of prosecution of the work therein, extraordinary risks to life and limb of the employee engaged therein are inherent, necessary or substantially unavoidable, and as to each of which employments it is deemed necessary to establish a new system of compensation for accidents to the employee therein."

When the injury is caused by the intentional omission of the employer to comply with statutory safety regulations, the provisions do not affect the civil liability of the employer.

The compensation provided for by the act is as follows: For injuries resulting in death: (A) If the employee leaves any widow, child or children, or parents or other lineal heirs to whose support he had contributed within five years previous to the time of his death, a sum equal to four times the average annual earnings of the employee, but not less in any event than $1,500 and not more in any event than $3,500. Any weekly payments, other than necessary medical or surgical fees, shall be deducted in ascertaining such amount payable on death.

(B) If the employee leaves collateral heirs dependent upon his earnings, such a percentage of the sum provided in (A) as the contributions which deceased made to the support of these dependants, bear to his earnings.

(C) If the employee leaves no widow or child or children, parents or collateral heirs dependent upon his earnings, a sum not to exceed $150 for burial expenses.

(D) Compensation for injuries resulting in death to be paid in installments equal to one-half the average earnings, at the same intervals at which the earnings or wages of the employee were paid while he was living, or weekly.

(E) Compensation for injuries resulting in death to be paid to the personal representative of the employee and to be distributed by him to the beneficiaries according to the laws relating to the descent and distribution of personal property.

Compensation for injuries resulting in disability: (a) Medical, surgical and hospital expenses not longer than eight weeks, not to exceed $200, and services of a physician during disability.

(b) For disability lasting more than six working days, compensation equal to one-half of the earnings, but not less than $5 nor more than $12 per week, and as long as the disability lasts, or until the amount paid equals a death benefit.

(c) For serious and permanent disfigurement of face or hand, compensation to be determined by arbitration under the provisions of the act, the amount not to exceed one-quarter the amount of his compensation in case of death.

(d) For partial permanent disability, compensation equal to one-half the difference between the average amount which he earned

before the accident, and the average amount he is able to earn after the accident.

(e) For complete disability, compensation for the first eight years equal to 50 per cent of his earnings, but not less than $5, nor more than $12 per week. If complete disability continues after payment of a sum equal to the amount of the death benefit or after the expiration of eight years, then a compensation during life, equal to eight per cent of the death benefit which would have been payable had the accident resulted in death, not less than $10 per month.

Other portions of the law provide for the payment of compensation for disability in a lump sum, for arbitration, for a basis for computing earnings, for medical examination at intervals, and a review of findings. The act gives claims under the law a preference over wage claims of other employees, and exempts them from garnishment, attachment, etc., to the same extent as wages are exempted, and provides that the claims shall not be assignable. No employee shall have the power to waive claims for compensation under the act, and any contract of employment, insurance or other device whereby the employee is required to pay a premium for insurance against the compensation provided for in the act is declared void. The act does not cover work of a clerical or administrative nature which does not expose the employee to the inherent hazards of the employment.

The question arises whether architects are included in the act under the class described as those "engaged in the building, maintaining or demolishing of any structure." A holding that architects are subject to the provisions of the act as "employers," would, in my opinion, be a forced construction of that particular wording, without taking into consideration the provisions of the entire act and the objects sought to be accomplished. Throughout the act the one on whom liability is placed is the employer engaged in specified work. An architect is not an "employer" with reference of the actual work done on a building. He is the owner's representative whose duties are to see that the contract is properly performed, and who, under the contract between the owner and contractor, has certain duties and powers as the agent of the owner.

The architect is not primarily engaged in building, etc. The employes of the architect are not "engaged in the building, maintaining or demolishing of any structure." The one taking the contract to bring about such work is the one charged by the statute. That person is the contractor.

The whole tenor of the act, the classification of death and disability compensation based on earnings, the safeguards thrown around the employe and many other provisions rebut the inference that the act applied to architects.

What is the occupation of the architect? Surely not "building, maintaining or demolishing any structure." Not one dollar of the architect's money goes to pay for labor or materials. Who are the employes of the architect? Clearly those engaged by him, paid by him, for services rendered in his behalf, and who are his employes in the ordinary meaning of that word. The workmen "engaged in the building, maintaining or demolishing of any structure" are not engaged by him, not paid by him, and are not subject to his orders. The orders of the architect are given to the one in control, the contractor or his foreman, and in giving those orders he acts as the representative of the owner.

On the other hand, the fact that the contractor is also the architect of the building would not relieve him from the provisions of the act. As contractor he would be the employer of those engaged in work covered by the act.

The Rockery

By IDA D. BENNETT

THE rockery affords opportunity for the culture of plants requiring special conditions, and is an excellent place in which to try out new things. That things do exceptionally well on the rockery ought to bring home to every gardener the fact that well drained soil is at the bottom of all success in gardening; and this attribute of drainage is, practically, all the advantage the rockery has over the level bed on the ground. To be sure, where the roots of the plants penetrate the ground to any depth, the rocks keep them cool and, to a degree, moist, but there is nothing dryer in a dry time, than a rockery and whoso would have a really successful one must water and so construct the rockwork that it shall retain moisture and not simply serve as a means for its swift passage to the ground outside.

From "Town and Country."

A really successful rockery should imitate, as far as possible, the natural cropping of rocks from the soil. It is best that the rock work should begin at some point where its emergence from the soil would appear a natural event. If no convenient wall or trees supply a natural starting point one can introduce one by planting a clump of ornamental trees, preferably white birches, and using a large boulder as a beginning. The long, tapering rockery has most to commend it, as it simulates a natural ledge of rock cropping from the ground. If it is desired to raise the level of the rock work, and stone is at a premium, a few wagon loads of earth may be dumped irregularly on the site of the rockery and the stones piled carelessly over and about this. As handsome colors as possible should be chosen for the stone and whole, not broken, stone should be used. The surface soil should be of the best garden loam for the main soil, with pockets of sand or leaf mould or other soils suitable for the plants to be grown. As the plants will all be set in pockets of soil between the rocks this makes the use of a variety of soils easily practicable.

In placing the rocks see that they are so arranged as to check the downflow of water, as far as possible. The little tumula of rocks so often seen in country gardens has almost always this fault and only a long and continued rain will have any effect upon the soil, and much of the soil is washed away at each watering. Of course, this is less the case as the rockery becomes covered with vegetation, but in the early days of existence, the loss by washing is serious.

On the tops of the larger rocks there will

be shallow layers of soil on which many creeping, rock-loving plants may be grown. One of the best plants for the purpose is found in the little silene—S. shafta—a charming little rock flower but six inches high and bearing in July to October masses of rosy pink flowers. Another form of a vivid, yellowish green, through silvery and reddish brown tints.

The arenarias, coronillas, houstonias, nierembergias, and pachysandras are all desirable low growths, but it will be readily understood that the planting should not be confined to low-growing things, but rather

A FEW ROCK-LOVING PLANTS.

Name.	Color.	Season.	Height.
Adonis	Yellow	May	12 in.
Ajuga	Blue	May	
Alyssum saxatile	Yellow	June, July	1 ft.
Arabis alpina	White	April, May	
Aremaria		May-June	Creeping
Aubretia	Purple	Spring	
Coronilla	Pink and white	Summer	Rank grower
Draba	White	Spring	
Erodium	Purple, red	June to October	
Ferns			Trailing
Glechoma	Variegated foliage	All summer	
Grasses			6 in.
Hepatica	Blue, white, pink, purple	May	
Herniaria	Low-growing plants, dark red foliage in autumn		
Heuchera	White, coral red	July-August	2½-3 ft.
Houstonia	Blue, white eye	Spring	Creeping
Linaria	Lavender and purple	Early summer	
Lithospernum	Blue	April-September	
Linum	White, yellow, red, blue	June-September	12-18 in.
Nierembergia	White		Creeper
Ononis	Rose, white	May-July	18 in.
Orobus		June	
Pachysandra			Trailer
Plumbago	Blue	Summer-fall	4-6 in.
Saponaria Ocymoides	Pink		9 in.
Saxifraga megaseas	Pink, white	Spring and in June	1 in.
Saxafraga Alpine		May-June	2-3 in.
Scutellaria	Blue	July-August	Trailer
Sedum	Pink, yellow, white		6 in.
Silene shafta			4-6 in.
Tunica	Pink	All summer	
Yucca	White	June-July	
Primroses	Yellow, white, red, purple	May	2-3 ft.
Polyanthus	Red, brown, yellow	May	6 in.

silenes is S. Alpestris, with white flowers in July and August, this variety grows but four inches high. The dwarf sedums are very valuable in rock gardening, the foliage of some of the sorts being quite as ornamental as the flowers. There are some dozen varieties of this plant with white, yellow and pink flowers and foliage ranging from that these should be used to fill in and bind the soil. Many tall-growing plants can be used with excellent effect, but in planting upon a rock work that is at all high it should be remembered that the tallest plants are planted at the top, the lowest near the base of the rocks.

A background of tall shrubs, evergreens

or trees adds much to the appearance of the rockery. Slender-growing trees, like the larches or white birches, are loveliest of all, and tamarix are exceedingly graceful and airy trees. There is nothing finer, however, for the rear of a low rockery than the hardy grasses, especially such varieties as Erianthus Ravenaea, Arounda donax and pampas grass. In fact, there are few plants better for any situation than these noble grasses. As a background or as isolated clumps on the lawn they are imposing and beautiful at all seasons of the year, and once established grow in stature and beauty year by year.

The yucca is always effective on the rockery, and does exceptionally well in this position. Spring-blooming primroses and pollyanthus, hepaticas and bluets are all indispensable and on the sunny, exposed side of the rock work one may colonize the hardy cactus, filling in a few pockets with sand and gravel. The best varieties for the purpose are Echinocactus Simpsoni, a variety conspicuous for its beautiful pink flowers and showy spines of yellow, straw color, purple and black. E. Viridiflorus has inconspicuous green flowers but striking bands of red, white and purple spines. Opuntia arenaria has yellow flowers and straw colored, shading to purple, spines, and there are a few others worth cultivating.

On the shady side plant ferns of any or all varieties. Where the soil will not be allowed to dry out to a dangerous degree the lovely English ferns, Seolopendriums, may be grown. These interesting ferns are quite hardy, but require a shady, moist spot to succeed. Foxgloves and columbines are some of the taller plants which appear to excellent advantage on the rockery, and I love to introduce the English daisy wherever a small plant will be in place. One of the prettiest little rockeries I ever owned was a little huddle of stones piled to mask a tub in which some seedling nelumbiums, too small for the lily ponds, were growing. This was nearly covered with very large and double pink and white daisies, and was as dainty and pretty a piece of gardening as one need wish.

In a low, wet spot back of the rockery plant bamboos, especially B. Aurea—an especially graceful species, growing in a feathery fan-shaped clump. B. Metake is the most hardy of the bamboos, but the top requires some protection which may be given by bending them down and covering with evergreen boughs or stocks.

Somewhere among the rocks find a convenient hollow which may be coated with cement and so furnish a bathing place for the birds; it should be shallow and broad. If possible to pipe water to the highest point on the rockery so that a little stream can trickle down from stone to stone the effect will be charming, especially if a fine spray is attached to the pipe so that the water may form a misty little fall. This may eventually be collected in a larger pool sufficient to contain a water plant or two; and along the edges, kept damp by the spray, moisture-loving plants may be grown. The rockery has great possibilities and may be so developed as to form a complete garden of itself. Certainly if I had a yard composed principally of rocks, as sometimes occurs in our New England states, I should, instead of blasting out and carting them away, see what I could do with a few wagon loads of earth and considerable taste and ingenuity to create a rock garden of noteworthy dimensions and beauty.

Curved Rafter Problems

By A. L. HIGGINS

NOT many years ago, I was at the building of a certain summer pleasure park in a New England village, and as it was a spring of the year "rush job," there were about 300 carpenters employed there, of all grades and ability. It was certainly interesting to note the various methods of framing, especially of getting the hips and valleys of the different styles of roofs to be shown there. and I think every variety known to the human eye, they—the architects—tried to imitate.

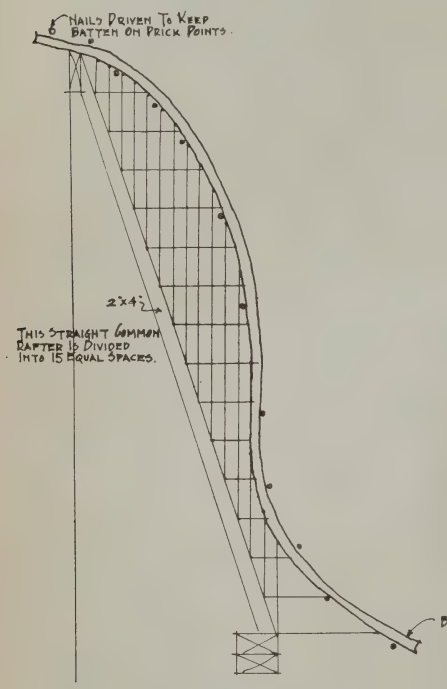

NAILS DRIVEN TO KEEP BATTEN ON PRICK POINTS.
2"x4"
THIS STRAIGHT COMMON RAFTER IS DIVIDED INTO 15 EQUAL SPACES.
BATTEN 1/4" THICK.

FIG. 1.
CUT OF MAIN OR COMMON RAFTER.
THIS RAFTER SHOULD BE FORMED AS PER THE ARCHITECTS DETAIL DRAWINGS.

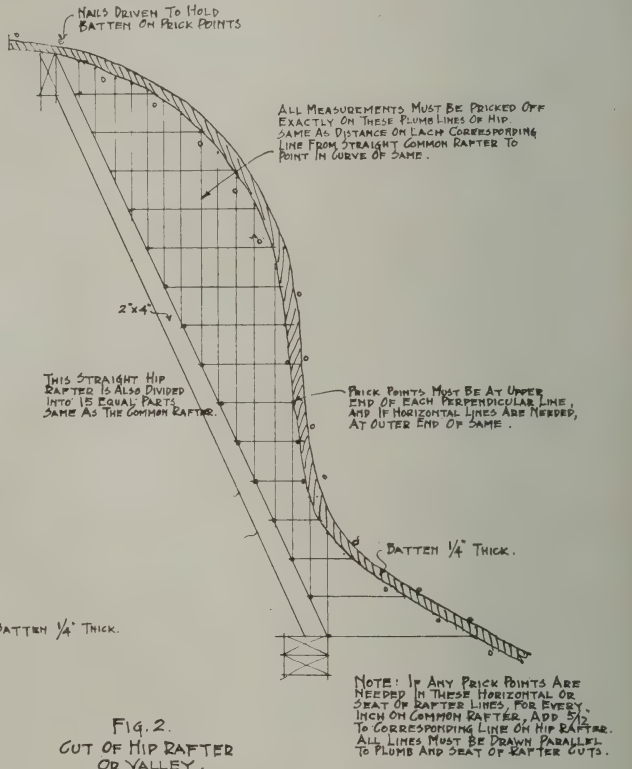

NAILS DRIVEN TO HOLD BATTEN ON PRICK POINTS
ALL MEASUREMENTS MUST BE PRICKED OFF EXACTLY ON THESE PLUMB LINES OF HIP. SAME AS DISTANCE ON EACH CORRESPONDING LINE FROM STRAIGHT COMMON RAFTER TO POINT IN CURVE OF SAME.
2"x4"
THIS STRAIGHT HIP RAFTER IS ALSO DIVIDED INTO 15 EQUAL PARTS, SAME AS THE COMMON RAFTER.
PRICK POINTS MUST BE AT UPPER END OF EACH PERPENDICULAR LINE, AND IF HORIZONTAL LINES ARE NEEDED, AT OUTER END OF SAME.
BATTEN 1/4" THICK.
NOTE: IF ANY PRICK POINTS ARE NEEDED IN THESE HORIZONTAL OR SEAT OF RAFTER LINES, FOR EVERY INCH ON COMMON RAFTER, ADD 5/12 TO CORRESPONDING LINE ON HIP RAFTER. ALL LINES MUST BE DRAWN PARALLEL TO PLUMB AND SEAT OF RAFTER CUTS.

FIG. 2.
CUT OF HIP RAFTER OR VALLEY.

The invariable method, so far as I could see, was to cut out the main or common rafter, and then with straight edge and shop ax, or chisel and mallet, word down or fashion the hip or valley, which was certainly a slow and laborious job.

Now, any carpenter who is familiar with the laying out of a hip roof, composed of straight rafters, with the steel square, can easily shape his common hips and valleys, of any curve or pitch, before putting them in place. The architect or draughtsman gives the shape of the roof, drawn to a scale of inches, and therefore the common rafter must be patterned first. Take a clean sheet of sheathing paper and tack it firmly to the floor, and have it sufficiently large. Then locate the plate and ridge thereon, and proceed to lay out the lines of a straight—say 2x4 inch common and hip. Proceed to divide each of them into an equal (common to both) number of spaces, and the more spaces, the more accurate the work will be. Proceed then similar to the way a boat builder would get a plank sheer, "taking spiling," with prick points and nails driven to hold his thin batten in place. The batten should be cut from edge of good clear spruce board, say 1/4 or 3/8 inch thick, to bend truly and evenly.

After laying out both the straight common and hip or valley, prick off the exact distance on the plumb cuts of each rafter (after having drawn all lines on each pattern parallel to the plumb and seat cuts), on both of the patterns, and see that each measurement is on the corresponding line of each pattern, and drive the nails so the batten will bend evenly on the outer side of the prick points. See Figures 1 and 2.

I always prefer using a separate stick for straight or under part of a curve rafter, and to make the curves or furring parts of other pieces, which can often be done with shorter material.

Cheapening the Construction of Fireproof Arches

By DR. ROBERT GRIMSHAW

ONE great reason for the non-introduction of fireproof arches, especially between iron beams and more especially where the walls are not parallel—is the necessity of having so many forms and sizes of molded sections with which to build up the complete arch.

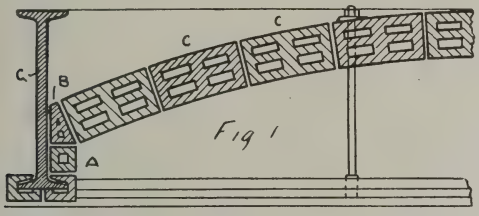


Fig 1

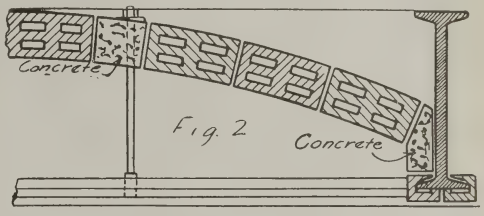


Fig. 2

As a rule there are, besides the standard hollow blocks which are used for the greater part of the arch, foot-pieces which must be made to conform more or less closely to the profile of the beams. Very often there is needed in addition a filling-piece, for purely fireproofing, not constructive purposes. Where the beams do not lie parallel to each other, the problem is more difficult and expensive to solve than where they are parallel throughout their entire length.

There is, however, a manner of getting around this difficulty in a very simple and effective way, which has also the merit of saving time and of costing no more than the regular construction—indeed, it is usually a source of saving.

Taking the case shown roughly in Figure 1—we have the T-beam or girder G with its casing of terra cotta, or other fireproof material; then comes a filling piece A, of square cross section, which, constructively, is no part of the arch; and on this abuts the trapezoidal foot B, of the arch proper; after which come the usual sections C, C, etc., all fortunately of one size and shape, and in this case requiring no key. The ceiling is hung from this arch from ¾-inch rods D passing through the arch and necessitating either hole-cutting or leaving a ¾-inch space

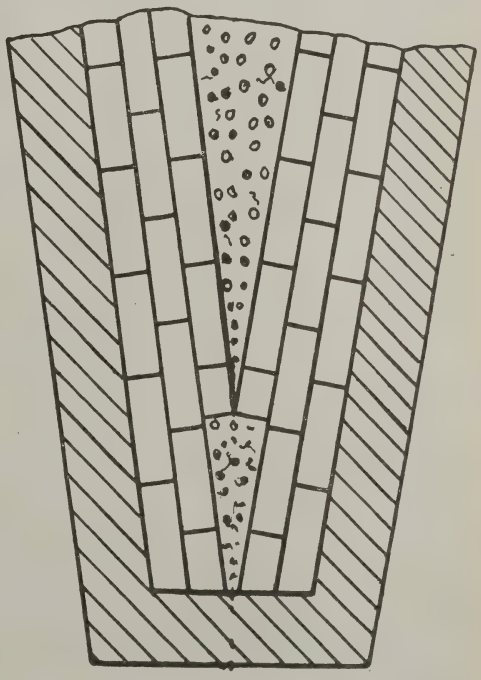


Fig. 3

between the ends of the sections in one bay (if I may use the expression in this connection) or between the several adjacent bays, which must be grouted.

The construction may be much more cheaply carried out. With reference to Figure 2—there must be used, whether by the method shown in Figure 1 or by that which I am just about to explain, a wooden arched centering. My plan is to dispense with the pieces A and B, Figure 1, and to tamp in stiff cement grout to take their place. This process is to be carried out all along the bays which rest on the section of centering—whether this be six feet or ten, or whatever it may be—the entire footing, corresponding to the pieces A and B for the length in question is run and tamped at one time.

Further—where the rods D are to come, spaces may be left between the ends of the blocks in any one bay, or between the sides of two adjacent sections—the former being preferable—and when the rods are in place concrete is tamped in around them, constituting a keystone. Where more than one set of rods are used to hang the ceiling between any two beams—as is often the case—the process is the same in principle—the effect being as shown in Figure 2.

Where the building or the room in question has non-parallel sides, the blocks are laid on the centering as far as they can be from the beams inwards towards one another, leaving an irregular key space between their ends as shown at E, Figure 3; this space is then grouted in with the concrete and well tamped. The keying is perfect—no question about either the fit or the price.

Circular Stone Stairs

By JNO. Y. DUNLOP

STONE stairs are an advantage over wood inasmuch as they are much simpler in construction, but the steps are heavy and require substantial walls for their support; moreover they become smooth under the friction of continual wear and then are very apt to become slippery and dangerous.

Stone steps are generally solid blocks and should be worked on the tread and the rise in superior stairs as is shown in Figure 1. The soffits are also wrought and the nosings moulded.

In setting out the stair for the purpose of making the mould, the first point to be considered is the plan and the tread and rise of the steps.

Figure 1 shows the plan of a circular stair with two up flights. The steps are built into the wall of the staircase in the one end and are supported on a stone balustrade at the other.

Figure 3 shows a section of the balustrade and it is with a view to setting forth the principles involved in the drawing and working of this part that this article has been written.

Figure 1 shows the plan of the stair with the balustrade following the inclination or rake of the steps. The balustrade being circular on plan causes a certain amount of twist in its working.

The method here shown is not probably the most profitable, but it is comprehensible and more true in form than when worked with a complication of moulds and bevel with a view to saving a small portion of the rough material.

The plan of the stair has now to be drawn down full size and the position of the balusters marked off. Then proceed to mark off on a height rod the various risers, allowing ⅛ of an inch for each front of the stone steps.

In proceeding to draw the developed elevation of the left hand side, Figure 4 shows the outside of the balustrade or the developed lines of the concave side of the plinth. That is to say, the horizontal line XY on the plan when straightened out is equal to the line XY on Figure 4.

The line of inclination is a vertical line, as the steps are of equal tread and rise, therefore the plinth starts with a straight line paralled to the nose of the steps.

On Figure 4 the joints are set off convenient to the size of the stone.

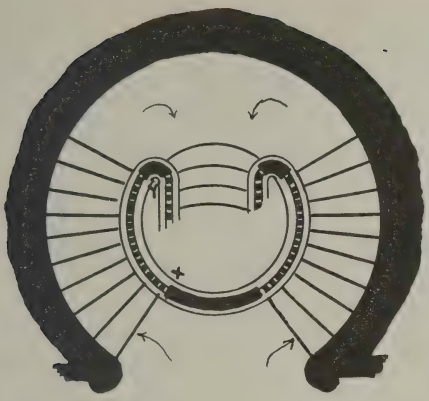


FIG 1

FIG 3

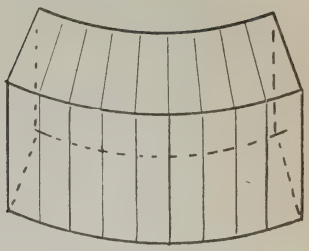


FIG 2

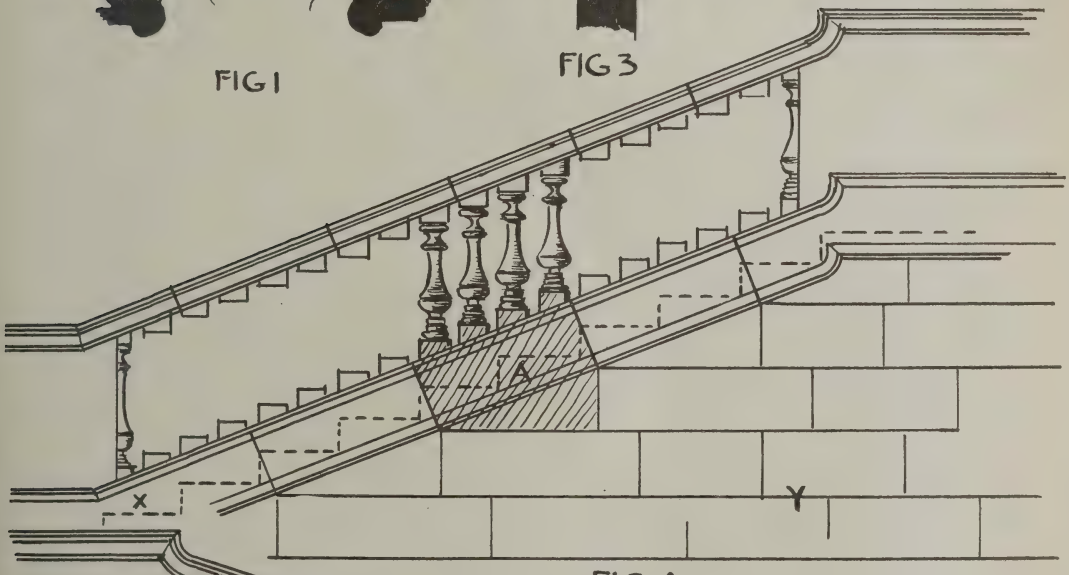


FIG 4

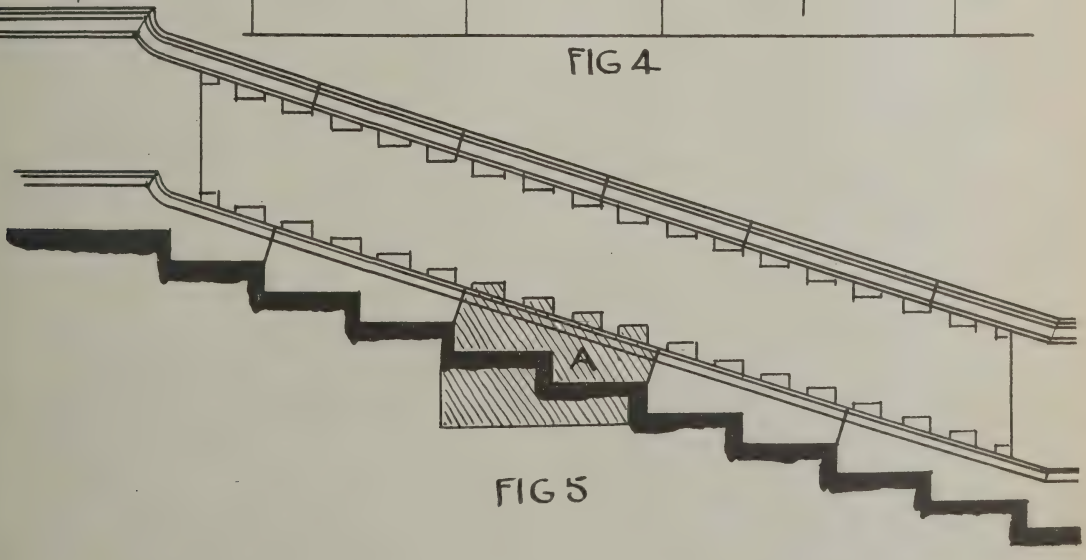


FIG 5

Figure 5 shows the development of the convex or stair side of the plinth.

The joint here requires to be set off to correspond with the joints on Figure 4. To do this, transfer the joints from Figure 4 to the plan Figure 1 and have them drawn across the thickness of the balustrade and to radiate to the center of the plan.

The position of the joints on the convex side should now be transferred to Figure 5, and the elevation completed.

For the purpose of illustrating the method of making the moulds and the working of the material, the stone A has been selected. The bed mould is shown at Figure 7. The concave or outside mould is shown at Figure 6, and the convex or stair side is shown at Figure 8.

The stone required to work this block will be rectangular in shape, and the length will be the extreme length of the bed mould. The width will be equal to that across the cord side of the mould, and the height will be that of the face mould. The stone should be wrought on the top and bottom beds, each surface of operation being parallel and the height equal to the face mould.

Scribe the bed mould on each bed, bonding the points so that the surfaces are out of twist.

The stone should now be cut through on both faces, which will bring the stone to the true segment of a hollow cylinder as shown at Figure 2. Now, apply the face mould, Figure 8, on to the convex side and the mould Figure 6 on to the concave side, work the joints through and scribe on the section mould, which will be obtained from Figure 3.

Cut off all the superfluous waste down to the top of the plinth and clean through the beds and seats for the stone balusters, as shown at Figure 9.

Next, gauge the width of the baluster's seats to the concave and the convex side, and work the same, thus completing the plinth stone as shown at Figure 10.

Each of the other plinth stones are similar and as the working of the capping for the balustrade is precisely the same as the plinth; namely, by working first a segment of the cylinder, then scribing on the face moulds, and the cutting and applying of the section mould, the working of the raking moulding on both faces will be easily followed.

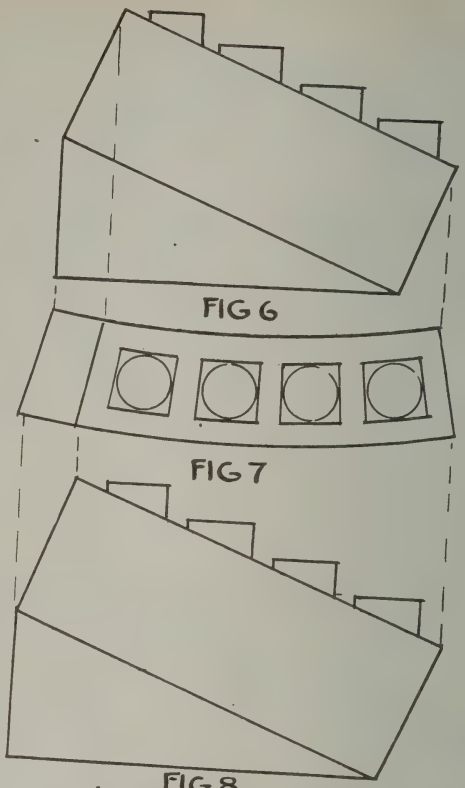


FIG 6

FIG 7

FIG 8

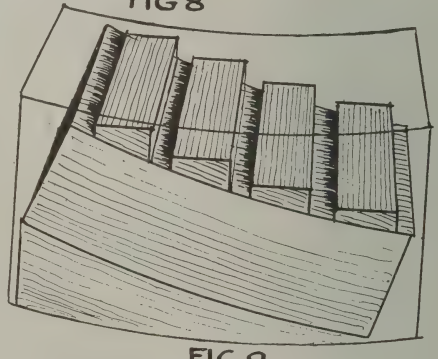


FIG 9

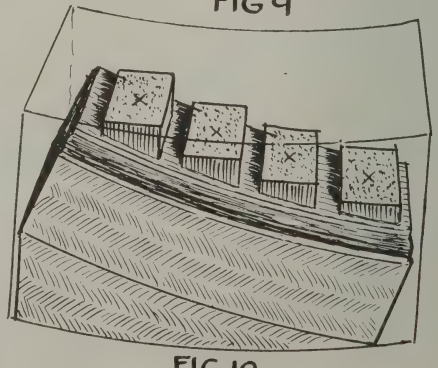


FIG 10

Patents

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

1,019,228. Building block. Edw. L. Dobbins, Jewell, Kans.

1,019,623. E. Fleming and A. M. Marsh assors. one-third W. D. Hopkins, Columbus, Ohio.

1,019,326. Concrete wall construction. S. Higgins, Jersey City Heights, New Jersey.

1,019,051. Sash holder. Wm. H. Kelly, Waynesboro, Va.

1,019,664. Door. L. Larson, Brady Island, Nebr.

1,019,334. Silo-roof construction. Chas. W. McClure, Saginaw, Mich.

1,019,505. Safety swinging window. E. McConnell, assor. one-half W. D. Hammond, Los Angeles, Cal.

1,019,690. Sash lifter. F. J. Odermatt, Tucson, Ariz.

1,019,567. Folding window blind. Geo. W. Wearn, assor. one-fourth W. E. McElroy, West Pompano, Fla.

1,020,033. Door check and closer. M. J. Flynn, assor. one-half E. W. McCarthy, New York City.

1,019,917. Concrete mixer. A. W. Ransome, New York City.

1,019,844. Door lock. Jno. M. Sauleiko, St. Charles, Ill.

1,019,857. Door closing and checking device. A. H. Sulser, Washington, D. C.

85,751. Asphalt roofing. Kelly-How Thomson Co., Duluth, Minn.

85,764. Flooring, edge strips for floors, etc. Nashville Hardwood Flooring Co., West Nashville, Tenn.

1,020,637. Sash lock. F. W. Chausse, Portland, Oreg.

1,020,645. Concrete structure. Chas. R. Hall, Seabeck, Wash.

1,020,919. Hollow concrete wall, Wilmot Lake, Washington, D. C.

1,020,776. Door hanger. S. and T. H. Parry, assors. Parry Mfg. Co., Indianapolis, Ind.

1,020,847. Lock. R. Schoell, assor. The Yale & Towne Mfg. Co., Stamford, Conn.

1,020,930. Locking device. Chas. L. Seeley, La Junta, Colo.

1,020,857. Waterproofing and preserving composition. A. J. Tucker, Sedalia, Mo.

1,021,443. Mold for concrete walls. A. Barone, Mount Morris, N. Y.

1,021,569. Composition for waterproofing concrete. W. C. Balden, assor. A. C. Horn, New York City.

1,021,181. Window frame. A. M. Deutschmann, Eltville, Germany.

1,021,245. Detachable hinge for windows. M. A. George, Bishop, Cal.

1,021,535. Closure for floor-openings. R. J. Kittredge, assor. B. W. Watson, Canastota, New York.

1,020,993. Metal weather-strip. A. M. Lane, St. Louis, Mo.

1,020,992. Weather-strip. A. M. Lane, assor. Monarch Metal Weather Strip Co., St. Louis, Mo.

1,021,611. Door catch. F. J. Lee, Wichita, Kans.

1,021,653. Metallic door. Jno. L. Lempera, Chicago, Ill.

1,021,695. App. for scrubbing and polishing floors. F. A. McKay, parish of St. Andrews, ford, Narberth, Pa.

1,021,548. Concrete skylight. L. W. Mulberth, Pa.

1,021,552. Tile structure for reinforced concrete floors. J. S. Nolan, Highland Park, Ill.

1,021,336. Fire escape. Manuel Rodriguez y Fonoll, New York City.

1,021,708. Floor oiler. L. G. Schaeneman, Albany, N. Y.

1,021,429. Reinforced concrete. Wm. F. Scott, Toronto, Ontario, Canada.

1,021,497. Floor scraping machine. Chas. T. Woodruff, Urbana, Ohio.

1,021,862. Swinging window. Ed. Culver, assor. one-half F. B. Bassier, Chicago, Ill.

1,022,123. Clip for metallic window sash. C. W. Davock, assor. Detroit Steel Products Co., Detroit, Mich.

1,021,985. Adjustable form for smoke chamber construction for chimneys. L. Jack, Moylan, Pa.

1,021,780. Fireproof floor construction for bldgs. E. V. Johnson, Chicago, Ill.

1,021,871. Store front construction. S. D. Kelley, Boston, Mass.

1,021,782. Roof light. A. Dlein, assor. J. K. John Aktiengesellschaft, Erfurt-Ilversgehofen, Germany.

1,021,844. Sheet metal roofing plate. H. E. Moomaw, Salem, Va.

1,021,803. Door check. J. C. Schmidt, assor. Famous Door Check Co., Chicago, Ill.

1,022,282. Roofing tile machine. O. Walter, De Kalb, Ill.

BUILDING TRADES INTERESTS IN THE COURTS.

BY GEORGE H. MURDOCH.

The plans and specifications for the construction of a large building should be definite, specific, and certain, in justice both to the contractor and the owner.—Nave v. McGrane, 113 P. (Idaho) 82.

A lien notice filed by a corporation, verified by E. C. H., "Secretary," is sufficiently verified, as the word, "secretary," is merely descriptive of the official title.—Independence Sash, Door & Lumber Co. v. Bradfield, 134 S. W. (Mo.) 118.

Where a contractor claimed to have been delayed in the finishing of a building by reason of the delay of a subcontractor, and was damaged thereby, the contractor could only recover such damages as he proved in fact resulted to himself from the subcontractor's delay, indefinite opinions and calculations of the architect being insufficient therefor.—Lautz Co. v. Glenn, 183 F. (U. S.) 666.

A provision requiring an architect's certificate of progress as a condition to the liability of the owner for payments to be made as the work progressed applied to construction of the building during the life of the contract, and not to a case where the contract was terminated by the destruction of the building by earthquake before completion.—Hettinger v. Thiele, 113 P. (Cal.) 121.

The architect should prepare a contract as a part of the plans and specifications, between the owner and the contractor for the construction of a proposed structure, in order to intelligently protect both parties thereto, as the owner, as a rule, has not a sufficient knowledge of such matters to know the details of such a contract.—Nave v. McGrane, 113 P. (Idaho) 82.

A "plan," when applied to a building, is an architectual drawing representing the horizontal sections of the various floors or stores of the building, the disposition of apartments and walls, with the situation of the doors, windows—in fact, represents the different stories as they are to be built, and the whole as it will appear when completed.—Nave v. McGrane, 113 P. (Idaho) 82.

Where a contractor for a building was to be paid 85 per cent of the contract price during its construction, payments to be made on warrants of the architect, and the architect, after issuing warrants for three amounts, died, such warrants for the balance of an uncontradicted claim are not a condition precedent to the contractor's recovery of the balances.—Pleasant J. Potter College v. George A. Collett & Bro., 134 S. W. (Ky.) 173.

The plans and specifications must be definite and certain as to the kinds and qualities of materials to be used and the class of workmanship, the time within which the building must be completed, the method of making payments, and matters relating to the insurance of the structure during its construction, and unless the plans and specifications are thus definite, the bid to construct the building would only indicate a willingness to negotiate further in regard to the matters not specified.—Nave v. McGrane, 113 P. (Idaho) 82.

There is an implied understanding upon the employment of an architect that the work shall be suitable and capable of being used for the purposes for which it is intended, and apart from questions of public policy this principle would prevent the architect from recovering payment for plans and specifications prepared in violation of law, unless he was so directed to prepare them by the owner.—Nave v. McGrane, 113 P. (Idaho) 82.

"Specifications" in architecture embrace, as understood by the profession, not only the dimensions and mode of construction, but a description of the material, its kind, length, breadth and thickness and the matter of joining the separate parts. It is a particular and detailed account of a thing; the accurate description of the materials to be used and work to be performed in the construction of a building; a written instrument containing a good, minute description, account, or enumeration of particulars.—Nave v. McGrane, 113 P. (Idaho) 82.

Where a building contract provided that in case the work be destroyed by earthquake, the owner should lose what he had paid to that time at what might be due under a clause of the contract requiring the owner to pay 75 per cent of the compensation as the work progressed, on certificate of the architect, and the contractor to lose for the unfinished work for which no payment was due, a termination of the contract on the destruction of the building was contemplated, and the contractor was not required to rebuild the structure.—Hettinger v. Thiele, 113 P. (Cal.) 121.

The testimony of a contractor, or contractors, to the effect that certain plans and specifications are sufficient will not be taken as pleas against the plans and specifications themselves, when they clearly show that they are not definite and certain, and against the recognized authorities on engineering, contracts and specifications, and architecture, and especially is that true where the plans and specifications will permit the bidder or contractor to figure on first-class and expensive material, and are not specific enough to prevent his using an inferior material of a less value. —Nave v. McGrane, 113 P. (Idaho) 82.

Where the specification for the electric wiring provides that "the wiring must all be according to the latest improved methods according to the city ordinance, and the rules and regulations of the underwriters, subject to their inspection," etc., and the court refuses to permit the defendant to show on cross-examination of the plaintiff that if the rules and regulations referred to constitute the National Electric Code, which is accepted as fire underwriters' regulations, such code authorizes the wiring in several different ways and that different kinds of material, some more expensive than others, may be used, the refusal of the court to admit such evidence held error.—Nave v. McGrane, 113 P. (Idaho) 82.

Building Material Price List

Revised to Date.

*—Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red Cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

	Chicago, Corrected by J. H. Touchstone.	Omaha, Neb., Corrected by I. P. Hicks.	Southern Ontario, Corrected by F. O. Frantz.
Dimensions, Hemlock Lumber—	M ft. BM S 2 S	M ft. BM S 2 S	M ft. BM S 2 S
2"x4" to 8" up to 16', No. 1	$20.00	yp $26.00	h $24.00
2"x4" to 8" up to 16', No. 2	18.00	24.00	22.00
2"x4" to 8" 18 and 20', No. 1	21.05	27.00	26.00
2"x10" up to 16', No. 1	20.50	28.00	24.00
2"x12" up to 16', No. 1	21.50	30.00	25.00
2"x14" up to 16', No. 1	*	*	26.00
Each 2 ft. over 20 ft., add per M	1.00	1.00	2.00
Select stock as above, add per M	5.00	*	*
Exterior Finish, Etc.—	M ft. BM D 4 S	M ft. BM D 4 S	M ft. BM D 4 S
1"x3" to 1"x8", No. 1	yp $32.00	yp $45.00	wp $35.00
1"x10", No. 1	32.00	43.00	40.00
1"x12", No. 1	37.00	46.00	42.00
1¼"x3" to 1¼"x12", No. 1	45.00	48.00	45.00
1½" and 2" same as above	42.00	48.00	42.00
1" drop siding, No. 1	24.00	30.00	30.00
½" lap siding, No. 1	*	rdw 30.00	30.00
Enclosing and Fence Boards—	M ft. BM S 1 S	M ft. BM S 1 S	M ft. BM S 1 S
1"x4" to 1"x8", No. 1	yp $23.00	yp $25.00	wp $30.00
1 x8" to 1"x16", No. 1	23.00	24.00	h 24.00
1"x16", No. 1	*	24.00	24.00
1"x16", No. 2	*	22.00	22.00
Interior Finish, Flooring, Ceiling, Etc.—	M ft. BM D S	M ft. BM D 4 S	M ft. BM D 4 S
½", T. & G. Flooring, No. 1	yp $26.50	yp $38.00	wp $40.00
½", T. & G. Flooring, No. 2	*	34.00	wp 30.00
Add for ceiling per M	1.00	2.00	1.00
Add for partition per M	2.00	2.00	2.00
⅝"x4", Ceiling No. 1	22.00	30.00	np 30.00
	100 ft. run	100 ft run	100 ft. run
4¼" Moulded Casing	yp $1.52	yp $2.00	wp $2.00
4¾" Moulded Casing	1.68	2.50	2.50
7¼" Moulded Base	2.53	3.50	4.50
½"x9¼" Moulded Base	3.75	4.00	6.00
1½"x4½" Moulded Window Stool	2.12	3.00	4.00
Miscellaneous List—	Per M	Per M	Per M
Shingles, No. 1	rc $3.30	$4.00	bc rc $3.75
Shingles, No. 2	3.35	3.75	*
Shingles, fancy	W.C.	4.50	6.00
Lath, 4 ft., No. 1	yp 3.60	y 5.50	wp 5.00
Lath, 4 ft., No. 2	2.75	5.00	s 3.75
Pickets, 1"x3"x4' 6", dressed	35.00	30.00	*
Pickets, 1"x3"x4' 6", rough	*	*	*
	Piece	Piece	Piece
6"x8' Post split	Cdr $0.13	Cdr $0.25	*
8"x8' Post split	.17	.30	*
8"x8' Post whole	.66	.40	Cdr $0.30
6"x8' Post whole	.25	.35	.25
Hardware List—	Cw.	Cwt.	Cwt.
Nails, wire, common	$2.25	$3.00	$2.85
Nails, cut, common	2.10	*	3.00
Nails, wire, fine finishing	2.65	3.50	4.00
Sash Weights, cast iron	1.60	1.50	2.25
Tarred Felt Paper, best 2-ply	Roll $1.00	Roll $1.00	Roll *
Tarred Felt Paper, 3-ply		1.25	*
Red Rosin, Atlas brand		.90	$0.50
Red Rosin, durable brand		.75	.60
Black Neponset		*	2.50
Masons' Supplies—	Per M	Per M	Per M
Brick, blue, at kilns	*	*	*
Brick, blue, at kilns, No.	*	*	*
Brick, blue, at kilns, No. 2	$7.50	*	
Brick, white, delivered, face	7.00	*	*
Brick, red, delivered, backing	7.00	7.50	*
Brick, delivered, dry pressed	18.00	18.00	$17.00
Brick, vitrified, dry pressed	*	24.00	*
Lime, best gray	bbl. $1.30	bbl. $1.25	bbl. *
Lime, best white	1.40	1.25	1.80
Cement, Portland	.95	1.85	*
Plaster, calcined	2.40	1.80	bbl. $2.50
Hair, 8 lb. per bush	.25	.25	*

Plaster (patent) $6 per ton. White Rock $11.00 per ton.

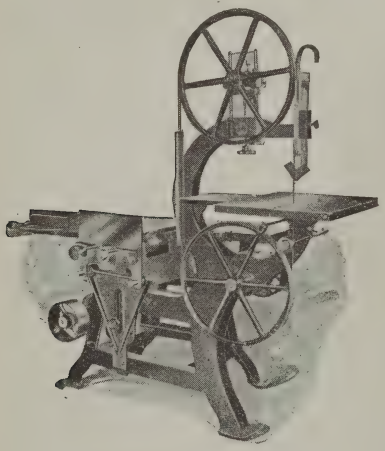
NOTE—While these figures are approximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

AN "ALL-STEEL-AND-IRON" UNIVERSAL WOODWORKER.

An important change in the construction of the Famous Universal is the substitution of an iron saw-table for one of wood; a similar change has been effected with the ripping gauge. This change has been effected to conform with present day demands which favor on all-metal construction of woodkorking machinery. Although the durability of the whole machine has been increased by this improvement, the price remains as before.

The remarkable growth of the universal woodworker says much for the progressiveness of carpenters and builders as a body, and their willingness to judge a product on its merit. Although of comparatively recent origin the universal woodworker now takes its place as a standard woodworking machine, and is practically indispensible for a certain class of contractors.

An example of its wonderful popularity is furnished by the number in use now, as compared with two or three years ago. Two, or possibly three, years back there were about



two hundred Famous Universal Woodworkers in use; since that time over a thousand more have been sold, bringing the total well up to twelve hundred. The efficiency of this class of machine is well vouched for by that fact that not one Famous has ever been returned or reported upon as causing trouble in any way.

Combining, as it does, the working qualities of sixteen different woodworking machines, the Famous comes as a boon to the small contractor as, by making one small investment, he is enabled to do his own millwork and stop paying out money to planing mills. The Famous is constructed in both the stationary and portable types, the latter being so constructed that it can be easily moved from place to place, together with its powder plant. Descriptive literature will be sent upon request to The Sidney Tool Company, Sidney, Ohio.

METAL CEILINGS.

Twenty years in the manufacture of metal ceilings and stamped metal products has given the Indianapolis Corrugating Company, Indianapolis, Ind., the experience necessary to produce accurate ceiling plates and to get up designs which meet with popular approval.

Beginning in a small way, as most firms did twenty years ago, they have worked up a very successful business in the line of stamped metal work of all classes and their catalogue, which is sent to readers of the NATIONAL BUILDER, shows a number of very pleasing designs in work of this character. It is possible by the use of metal ceilings to obtain as elaborate decorations as desired and at a minimum of cost. Those who are anticipating the erection or alteration of buildings in which work of this character can be used should obtain the catalogue of the Indianapolis Corrugating Company, as it gives, besides the various designs, instructions for measurements and erecting this work.

Those not familiar with stamped metal ceilings might imagine that it was beyond their capacity to put them up, but the directions as given in this catalogue will show them that the plates are so accurately fitted that their installation requires no more than the average skill.

MODERN HOUSEHOLD IMPROVEMENTS.

Only a few years ago it was considered impossible for any except city houses to have what are now considered the necessities in the line of equipment. Country houses were heated by wood or coal stoves, lighted by oil lamps or candles, and water was obtained from a well in the yard or a cistern with a pump in the kitchen.

Today there is no occasion for any house, no matter how far remote from the city, to be without the conveniences to which the city dweller is accustomed.

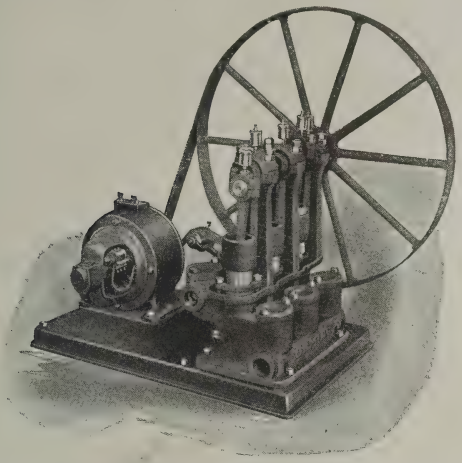
The manufacturer of plumbing, heating and lighting plants has become so standardized that it is possible for a mechanic of ordinary ability who is able to read and follow directions to equip a house or other building with any of the conveniences required.

The Missouri Water & Steam Supply Company, 931 South Sixth street, St. Joseph, Mo., has brought the manufacture of this class of goods to the place where it is possible to obtain complete equipment at a minimum cost. This equipment is made up in such a way that the services of a high priced or extra plumber are not absolutely necessary.

Their catalogues on waterworks, plumbing supplies, heating and waterworks systems show very complete equipment for these purposes. Those who are interested in this class of work should obtain their catalogues before proceeding with the work, as it may be the means of saving a considerable sum of money as well as time and material.

DEMING POWER PUMPS.

Catalogue "H" of the Deming Company, Salem, Ohio, shows a very complete line of hand, steam and electric pumps of various



characters. To one not familiar with the various pumping problems connected with engineering work, the catalogue is a revelation as it shows to what perfection machines of this character have been designed.

As there are many places where pumping must be done and pumps, either temporary or permanent be installed, it would be well for those interested to obtain this catalogue as it shows in full detail many pumps, particularly adapted for contractors' use and also contains a number of tables of useful technical information, capacities of pumps, irrigation quantities, etc., which are of both interest and value.

The Deming Company also make a complete line of spraying apparatus for use on farms, commercial orchards, etc. It is an unquestioned fact that spraying greatly increases the percentage of merchantable fruit, and in some states spraying is compulsory, as by no other way can the insect and other pests be kept from doing great damage.

The Deming Company have agencies in all the principal cities, their agents for Chicago being Henion & Hubbell, 223-231 North Jefferson street.

Henion & Hubbell are agents also for a number of other engineering and building specialties such as hydraulic rams, contractors' hose, etc., and it is well for contractors and builders in need of machinery of this character to correspond with them.

WIRE LATH.

The use of wire lath for plastering fireproof partition, stucco, etc., as well as heavier grades of wire mesh for reinforced work, has become so general that every worker in cement and concrete should be posted upon the merits of the various grades and makes. What is suitable in one place might be entirely wrong for another at a waste of time and money.

The Buffalo Wire Works Company, 442 Terrace, Buffalo, N. Y., manufacture a very complete line of wire cloth and wire mesh for various purposes.

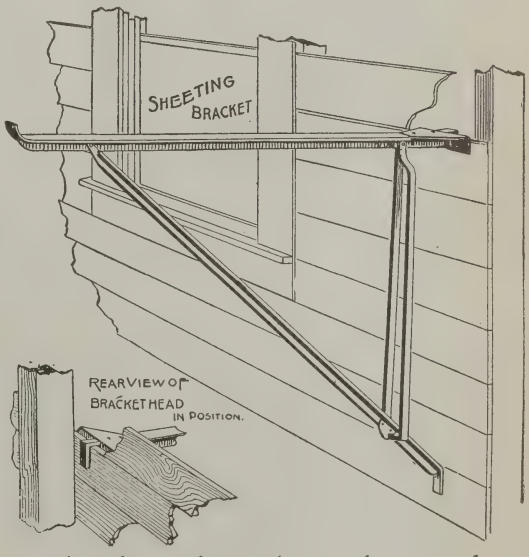
Contractors and builders anticipating the use of reinforced concrete, stucco, ornamental plaster, etc., should secure their circulars and see what a saving in time and money can be effected by using their products.

THE "DETROIT" FOLDING SCAFFOLD BRACKET.

The days of the wooden scaffold are rapidly passing. With shorter hours, higher wages and higher costs of material, the successful contractor is the one who takes advantage of every small saving. When a scaffold can be set up complete in 15 minutes with steel brackets, and later taken down in less time and moved to the next job, it will never pay a live builder to follow old methods.

The predominating feature of the "Detroit" bracket and one of the main ones covered in the patent, is its tendency to carry the load strain downward and not outward. Its construction is such that the load is communicated through the lower brace to a steel loop, which is attached to the platform of the bracket within three inches from the side of the building. This makes it possible for their sheathing bracket to be used safely where the tendency with others would be to pull out.

It folds compactly to permit of its being transferred conveniently from job to job. Being made from angle iron, its weight is not



enough to be ponderous, but amply strong for any load that it might be subjected to.

Instead of using outside means to attach it to the building it has an automatic grip, which is easily slipped around the studding or over the sheathing, and when the lower brace is brought into position the grip closes and holds it firmly in position. It is adjustable for different sizes of studding.

WHITE PINE AND THE "RUTHLESS SLAUGHTER."

In the year 1620 the good ship Mayflower dropped anchor off the Massachusetts coast and reported a stormy passage.

And the next day the Pilgrim Fathers, armed with their trusty axes, got busy on the slaughter of the white pine—that being long before Gifford Pinchot had anything to say about forest conservation, prior also to the writing of that familiar ode, "Woodman, Spare That Tree."

But hold! Among the party was one who must have been some kin to Gifford—one Joshua McGee, who was in favor of moderation.

Josh told the "house committee" of those days that they should go sort of slow, for there was a limit to those trees.

These forests are "14 or 15 miles long, and perhaps 300 miles wide," he told them, "and it won't hurt none to cut a few masts each year, but we don't wont to overdo it."

They cut masts till there was a mast every way one looked. Every humble cot had its own private mast with a flag nailed to it.

* * *

In the year 1908 they were still "ruthlessly slaughtering" the white pine "masts" in Massachusetts and cutting them up into lumber and we are told by the Government reports that the total "slaughter" in this same old neighborhood in that year was 238,000,000 feet!

Two hundred and sixty-two years after Brother Joshua sounded his warning, 238,000,000 feet of white pine was cut in this same locality where he flourished, and yet there seems to be no perceptible sign that the supply will be exhausted, even should the same amount be cut each year—according to the Forest Service.

There is white pine, and plenty of it, for all purposes and for centuries to come, for it is a prolific grower and a great reproducer.

The annual cut of the Northern Pine Manufacturers' Association of white and Norway pine is in excess of 1,250,000,000 feet.

The Northern Pine Manufacturers' Association of Minneapolis, realizing that a false impression obtained in the minds of many people, and among them not a few retailers of lumber, as well as users, regarding the white pine production, have entered upon a very extensive campaign of advertising with the idea of showing their resources in this wood of our forefathers. "White pine and plenty of it" is their slogan. They are offering a book entitled "Why—When—White—Pine" which is sent free to anyone interested. A book giving much useful and instructive information to those about to build—as well as those engaged in selling lumber—to get them right on the subject of white and Norway pine.

The trade as a whole will be glad to welcome this old wood and see it take its former prominent place among American woods.

SOUND PROOFING.

One of the most difficult problems for the architect to solve is that of sound proofing a musical studio or other places where a number of pianos or other instruments are being played at the same time.

Cabot's quilt, made by Samual Cabot, Inc., Boston, Mass., has given unusually good satisfaction for this purpose, one of the buildings it has been used on being the Institute for Musical Art, New York.

Tests of this Quilt in connection with other sound proofing substances have proven it to be particularly well adapted for the purpose.

The Quilt is also used for insulation against heat and cold, and is in use in cold storage buildings, requiring careful insulation.

It is interesting to know that the portable living huts and observatory of Captain Scott's

Institute for Musical Art, New York.

British Antarctic Expedition are lined with Cabot's Quilt to protect the men against the extremely low temperatures.

Full information regarding the wonderful qualities of Cabot's Quilt can be obtained from Samuel Cabot, Inc., 141 Milk street, Boston, Mass.

BED ROCK PLANES.

The Stanley Rule & Level Company, New Britain, Conn., are sending out to carpenters and builders a new folder of their Bed Rock Planes. The circular shows a number of the styles made as well as sections showing the different parts and the operations of adjustment.

The circular also describes in detail the exact operations of adjustment by which extreme accuracy, and even cutting edge, and elimination of all vibration, is obtained.

We understand that the Stanley Company are anxious to get this circular into the hands of every carpenter and builder and it is certainly worth sending for.

MILKS' FRAMING INSTRUMENT.

Stair work is a problem that many carpenters do not understand and as a consequence there is time lost, and lumber wasted in stair

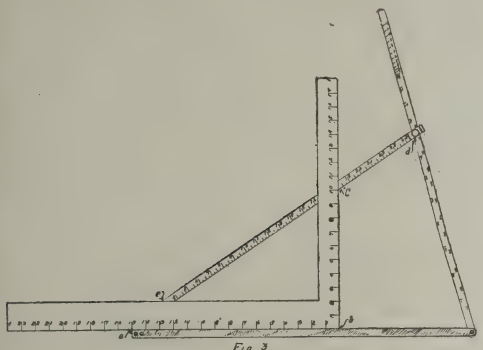


Fig 3

work, as well as in other places, where the use of modern tools is not thoroughly understood. There are a number of methods by which cuts, bevels, etc., may be readily obtained. The steel square furnishes a key to a great many of them but the square in itself is not always sufficient to lay out the work to the best advantage.

The Milk's Framing Instrument as shown in the cut herewith is a simple device for obtaining cuts, bevels, etc., of various characters. By the use of this instrument any of the cuts required for stair work, roofs, braces, heavy framing, etc., can easily be obtained. The accuracy with which this work is done is a great point in its favor, the mechanical perfection of the instrument being such that there is slight variation from the absolutely true measurements obtained by intricate mathematics. The use of this tool gives the carpenter who is able to read and follow instructions the same facilities for laying out work as the most experienced millwright.

Every carpenter should be posted on the merits of this tool and the Parson's Tool Manufacturing Company, 2030 Corning, Parsons, Kan., is anxious to send circulars and information.

ROOFING TERNE PLATES.

The manufacturer of roofing terne plates in this country has now become so well established that it is unnecessary to go abroad for sheets of this character. The American Sheet & Tin Plate Company, Frick building, Pittsburgh, Pa., have made a long and extensive study of conditions and materials and believe that their M. F. brand of roofing terne plates, which, as well as their other plates, are made exclusively from the best grade of copper bearing open hearth steel, insures the highest quality of material.

The process of manufacture, selection of materials, etc., is too complicated for discussion in these pages at present, but we are in a position to announce that the American Sheet & Tin Plate Company will be very glad to send complete information, full sized samples, etc., to any who are interested enough to write for them.

There has been so much poor roofing plates put on the market that the use of this material for roofing has received a serious setback. It will be well for contractors and builders, as well as roofers and sheet metal workers, to be posted on the good qualities of the various brands manufactured by the American Sheet & Tin Plate Company, and we would suggest that their offer to send samples for testing, etc., be taken advantage of.

BUNGALOW BOOKS.

By the use of shingles of good quality with a good grain of stain, it is possible to obtain any artistic color effects desired. Where the sides of the building as well as the roof are covered with shingles, the use of stain reduces the paint bill appreciably.

The Red Cedar Shingle Manufacturers' Association has just issued a bungalow book which shows many beautiful designs from actual photographs along with floor plans, estimated cost and various other details.

The Red Cedar Shingle Manufacturers' Association, 516 White building, Seattle, Wash., are glad to send this book to any who care for it and we are advised that it is only necessary to send a two-cent stamp in order to obtain this interesting book.

MASONS TOOL SATCHELS.

The workman employed in a shop has a comparatively easy task in keeping his tools in good order. The man on the job, however,

is obliged to carry them from job to job, from floor to floor and take them out every morning and back at night. His work requires a carrying case which shall be at once handy, durable, suited to the work and protect the tools from dampness, etc.

The Excelsior Bag & Manufacturing Company, Troy, N. Y., are manufacturing a line of masons, carpenters, gas fitters, plumbers, etc., tool satchels, one of which we illustrate on this page. These satchels are made of very strong eighteen-ounce duck, waterproofed with a special composition.

The use of a bag of this character is indispensible to masons and it is surprising that anyone should carry their tools in a dirty cement bag, subjecting them to hard usage, danger of loss, etc., when bags of Excelsior character can be obtained so cheaply.

We would suggest that every mason, builder or mechanic in the building lines write to the Excelsior Bag & Manufacturing Company for their complete catalogue, showing the various styles of bags, satchels, etc., which they manufacture.

GAS MACHINES.

There are many isolated buildings, plants, etc., which would be greatly benefited with gas installed but which do not have it on account of the expense of piping from one of the established gas companies.

For such places as these, as well as for economy where a gas plant is in operation, the Economy Gas Machine Company, 437 East Main street, Rochester, N. Y., manufacture a special line of gas machines. These machines are perfectly safe in operation, as the supply tank is located at a distance from the building and there is no more danger than from the ordinary illuminating gas in common use throughout the country.

By the use of a machine of this character the owner is entirely independent of the gas company, meters, etc., as the entire plant is under his direct control. The operation of the plant requires but a few moments' time occasionally and the gas supply is constant for use for lights, gas ranges, water heaters, etc.

Plants of this character are especially successful in country places where several families can unite to own one common plant, thus reducing the unit cost.

As every family wishes to have their home equipped with gas for heat and light, it would seem well for contractors and builders to investigate the Economy system of gas making with a view of installing them in new houses or in those already built.

The Economy Gas Machine Company will send complete literature, instructions, etc., regarding their machines.

"THE STANDARD" LOW CHARGING MIXER. NEW DESIGNS.

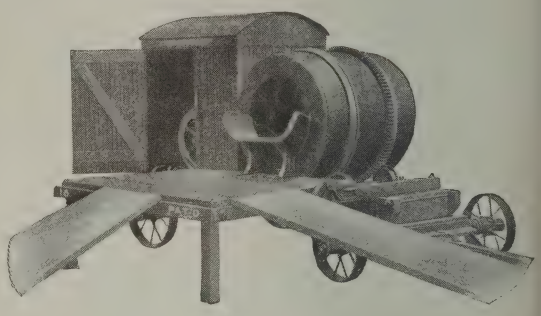
The Manufacturers of "The Standard (formerly Eclipse) Low Charging Concrete Mixer, in addition to the regular outfits same as formerly furnished, are prepared to supply the contracting trade with several novel designs and modifications, advantages of which will be apparent to the wide-awake contractors. One of the designs shown on illustration herewith, is provided with a folding platform, which is raised up in front of mixer drum, and fastened with a hook, when it is desired to move or ship the machine, and it can be quickly dropped down in mixing position thus making a wide platform, ready for immediate use.

This design will be appreciated for use on narrow streets or beside car tracks as the folding platforms can be lifted to allow vehicles or cars to pass.

Another design, which is not illustrated, is "The Standard" Low Charging Mixer with Cart Charging Arrangement, whereby the entire batch is transported from piles to the mixer platform, in a two-wheeled hand cart, guided by one man and pulled by a rope running to a hoist which is operated by the engine on mixer.

This simple arrangement will enable one man to bring all the materials from the piles to the mixer even if the distance is fifty feet or more. Several carts are used so that there are always some to be filled where the mixer is being charged. The results obtained by this method have been very gratifying, as very rapid work can be accomplished, with a very small force of men.

The special designs referred to are only a



few of the equipments and arrangements worked out by the Standard Scale & Supply Company, 1345-47 Wabash avenue, Chicago, manufacturers of "The Standard" Batch Mixer. Other information will be furnished upon application to any of their houses or agencies.

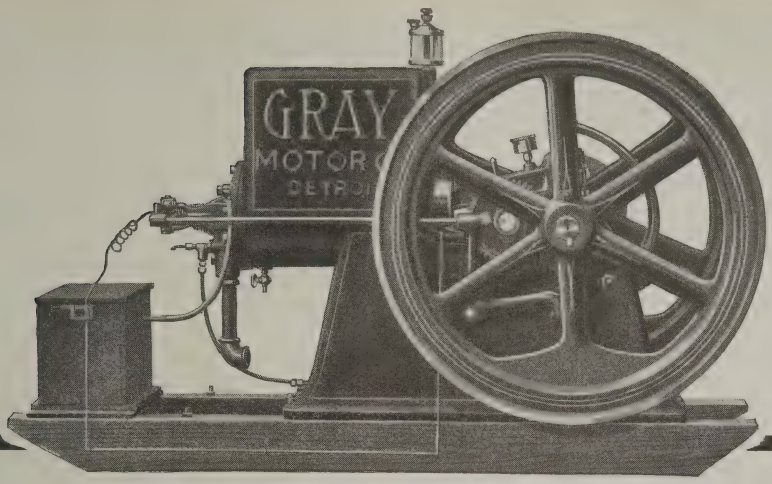
SASH CHAIN.

At the rate Messrs. Smith & Hemenway Company of 150-152 Chambers street, New York, are putting out new tools and hardware specialties of their own manufacture during the present year, it will not be long before the trade and consumer can obtain almost anything in the hand tool or hardware specialty line with the well and favorably known "Red Devil" trademark stamped on it.

The manufacture of sash chain and sash chain fixtures had been under consideration and experiment by them for some time but the perfecting of a special grade of bronze metal that would add from 15 per cent to 25 per cent to the strength of the chain has only just been completed and the chain is now being put on the market. It is claimed that in making "Red Devil" Stirrup Loop Sash Chain (which is the name they have given it) that they add from 15 per cent to 25 per cent more strength to the chain than where chain is cut in the ordinary square link fashion.

"Red Devil" Stirrup Loop Sash Chain is made in all sizes. No. AA, A, O, 2, 1 in "Red Devil" Bronze, in Steel and in Steel Coppered.

It is put up on reels containing 500 feet. Prices, samples, etc., will be sent to any of our readers by Smith & Hemenway Company, New York.



Bigger Profits on Every Job

Here's the ideal gasoline engine for the contractor and builder. It could not be better adapted to the requirements of the average man in this business if it were made especially to order for his particular needs. It's a time saver and a money maker. Why not give one of these engines the chance to increase your profits?

It is the engine that will plug along from morning till night without a letup—causing no trouble and using the minimum amount of fuel.

Will run the band saw, emery wheel, cutoff saw, jig saw, combination wood-worker, hoisting rigs, cement mixers, etc.

Especially well adapted to running the various wood-working machines advertised in this publication.

Use it in the shop or out of doors—makes an ideal portable outfit to take around to the different jobs.

Runs in any kind of weather—requires very little attention—furnishes **big** power or little power as required, and uses fuel in proportion to the power used—the automatic governor works perfectly.

Works all Day for a Few Cents

The first cost of this high grade—guaranteed engine is only a small consideration—they make a paying investment.

The cost for fuel is very small—will run **all day** doing the work of from 2 to 4 men at a cost of from 20 to 40 cents, depending upon the work to be done and the power needed.

Hoisting Rigs

We can quote you a very attractive price on a complete 4 H. P. hoisting rig—if interested write for special information on this subject and prices.

We'll Help You Make the right Selection

The engine shown above is a 4 H. P.—it delivers **big honest horse power too**—it's the engine that will answer the requirements of a big majority of contractors and builders.

In some cases a larger engine might be required or a smaller size might do the work you have to do.

We have other sizes to select from, 1½ H. P., 2½ H. P. (and by the way, the 2½ H. P. is another engine that we can recommend especially to carpenters and builders), 6 H. P., and 12 H. P.

If you are not sure about the exact amount of power required, get our specifications—tell us what work you want the engine to do—our service department will give you an honest recommendation of the proper power for your need.

There is no use in getting more power than you need—it's a waste of money. Then again you will be dissatisfied if you get an engine that won't do all the work you have for it to do.

Write and ask questions—get the benefit of our experience—it's to our interest to tell you and tell you **right.**

30 Days Trial

We are willing to ship you one of these engines to try out at your own work—give it hard jobs to do every day—test it out thoroughly—if it does not prove to be everything we claim for it, we take the engine back and pay the freight.

Write today for our big engine catalog and ask for information about this **special trial offer.**

GRAY MOTOR COMPANY, 561 U. S. Motors Building. **Detroit, Mich.**

REMOVAL NOTICE.

We are advised by E. H. Sheldon & Company, formerly at 321 North May street, that they have removed their offices and plant to 178 Nims street, Muskegon, Mich. This change is necessary on account of the large increase of their business which they have specialized on carpenters' clamps and vises and manual training school supplies such as tools, benches, etc.

HARDWARE PRICE LISTS.

The Rehm Hardware Company, 1503 Blue Island avenue, Chicago, Ill., issue a separate price list on the builders' hardware, tools, roofing, etc., shown in their catalogue. This special price list gives the contractor the opportunity of showing the prospective home builder the catalogue from which to make his selection, without any chance of an argument as to prices. Prices vary on builders' hardware from time to time. The Rehm Hardware Company is able to take advantage of these changes and give its customers the benefit. By publishing a separate price list the price can be easily changed without waiting six months or a year to get out a new catalogue.

Where prices are shown under each item in a catalogue, there is always a chance for dispute. If the prices are not net, contractors are obliged to figure out what the net price is. This makes extra work and takes time.

The Rehm Hardware Company's price list shows the prices so plainly and in such a way that no figuring is required. The contractor knows where he is at every minute with the Rehm price list and catalogue. The price list is printed in a convenient pocket form and is easily referred to when figuring out a bill.

Anyone writing to the Rehm Hardware Company will be placed on their list not only for the catalogue and price list, but for their bulletin as well. This bulletin is published from time to time and shows a large line of seasonable goods at the very lowest prices. No charge is made on either the catalogue, price list or bulletin.

RUBBER SHINGLES NOW GETTING PREFERENCE.

Some of the best known architects and building contractors today are giving preference to rubber shingles where handsome effect is desired.

These rubber shingles are a beautiful gray in color, similar in tone to slate, have all the beauty and attractiveness of other styles of roofings, without any of the drawbacks. As a consequence they are being preferred by the owners of expensive country and suburban homes—by the man who takes a pride in every detail of his building—those who aim for artistic effect, durability and economy—every one who appreciates a roof covering of attractive appearance.

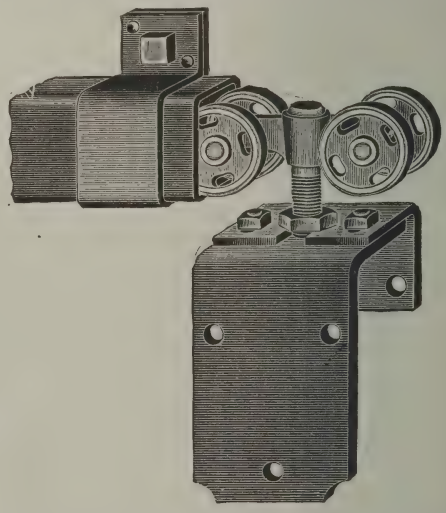
It has been found that this modern rubber shingle lends itself to any kind of trimming along the ridges, hips and angles of the roof, giving the home a comfortable, cozy look. Another reason why the rubber shingle is rapidly replacing all other styles of roofing is the fact it comes in a larger size than the ordinary wooden shingle, consequently can be put on quicker and with less labor cost.

And when it comes to the question of cost, the rubber shingle has another decided advantage because it is being sold by the lumber, hardware or building material dealer at a price so low, as compared with prices asked for other roofing materials, that the owner of a building simply can not afford to use anything else.

The General Roofing Manufacturing Company with its three big mills at York, Pa., Marseilles, Ill., and East St. Louis, Ill., are now producing what is known as Certain-teed Rubber Shingles. Instead of making a lot of extravagant claims for their product, they have settled the question of quality by guaranteeing their Certain-teed Rubber Shingle for a period of fifteen years. This concern has just issued a new booklet, "How to Build for Less Money," which contains a lot of valuable roofing information. They will send it free to any reader of the NATIONAL BUILDER who requests it.

BALL BEARING DOOR HANGERS.

The Richards-Wilcox Mfg. Co., Aurora, Ill., are issuing a booklet entitled "Garage Door Equipment" for the use of architects and builders. This catalogue shows a number of methods of arranging sliding doors for use in confined spaces, such as occur in garages where practically the entire front must be opened up to admit the car.



Paradoxical as it may appear, it is possible by the use of the Richards-Wilcox hangers to slide a door from the end of the garage flat against the side, thus giving a much larger opening than would be possible with ordinary door hangers.

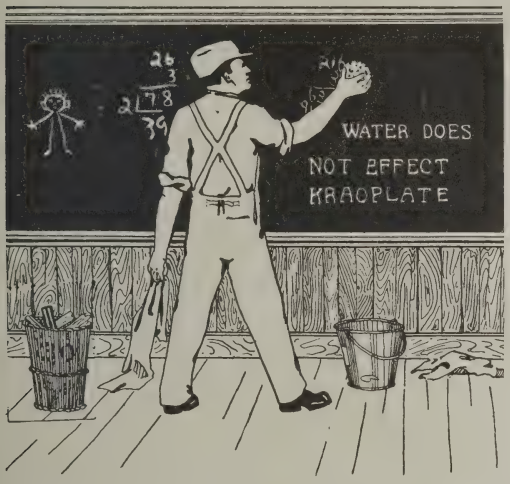
This is only one of the features shown in this excellent booklet.

SCHOOL SUPPLIES.

Education is one of the most necessary problems which confronts the student of sociology today. It is only by education that the betterment of the human race can be advanced.

However far the advance in education proceeds, the start must be made in the schoolroom and no method has been found superior to the blackboard representations to start the young scholars into ways of thinking for themselves.

The blackboards in use a few years ago presented a surface which was far from ideal. When the plaster was merely surfaced with a black composition, a few days' use developed soft spots and hard glazed places, trying both the temper of the teacher and the eyes of the scholars.



When the wall was covered with cloth the effect was not much better as the cloth soon wore through.

The Atlas School Supply Company, 1020 Van Buren street, Chicago, Ill., manufacture a composition blackboard in sheets of any desired size, to take the place of the old-fashioned wall surface. The composition, which they named Kraoplate, is a permanent, solid substance—black all the way through. It is close grained and the chalk dust will not stay in the surface pores and it does not become dirty or glossy, but retains the same blue black color. The manufacturers guarantee Kraoplate for ten years under ordinary usage, which would indicate that it was a permanent composition.

Besides Kraoplate, the Atlas School Supply Company handle all the supplies used in the modern school room, such as globes, maps, charts, desks, tables, seats, bookcases, etc. Their catalogue should be in the hands of every school director and is of value to every contractor contemplating or figuring on the erection of school buildings.

THE FOX FLOOR SCRAPER.

Perfect work requires a machine which will do its work properly under all circumstances. No class of work is more exacting than floor scraping as it is the finish of the largest area in the house. A slight inaccuracy in furniture or trim can easily be overlooked but a wavy,

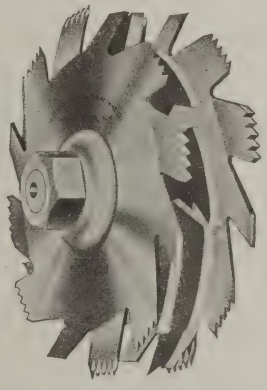
scratched or marred floor shows up prominently and cannot be hidden.

The Fox Supply Company, 115-123 King street, Brooklyn, Wis., are satisfied that their floor scraper will do the best work under all circumstances. They are satisfied enough to send their machine on trial where it can be tested alone or in connection with other machines. No proposition can be fairer than this as it gives the contractor an opportunity to see and to use exactly what he is buying before he pays for it.

A line to the Fox Supply Company will bring full information and details regarding their special offers to contractors at this time of the year.

SAW TABLE ATTACHMENTS.

The great increase in the use of woodworking machinery, portable saw rigs, etc., has made possible the use of a number of special tools for doing the work about the shop at a great saving of time, money and material. On this page we show a cut of the Huther Brothers Patent Groover or Dado Head. This tool can be attached to practically any of the



saw rigs now on the market and by its use, it is possible to do any complicated work in

grooving, dadoing, etc. It is interesting to know that this head is adjustable so that it will cut any width of a groove from an eighth of an inch up, the graduations being as small as a sixteenth of an inch.

From the peculiar character of the head, it is possible to cut a perfect groove, either with or across the grain or at any angle.

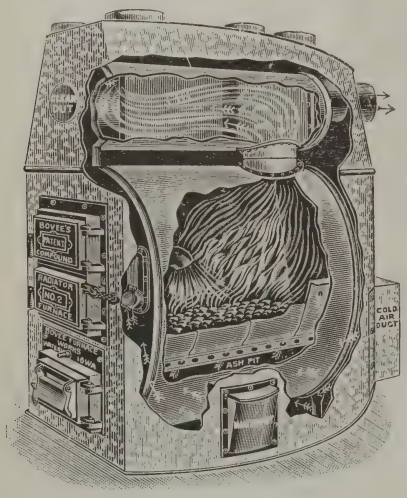
For special work, which requires a number of parallel grooves, this head can be arranged to do such work.

The Huther Brothers Saw Mfg. Company, 500 University avenue, Rochester, N. Y., make a complete line of saws, heads, knives, etc., not only for the regular work in the building line but for special work such as cooperage, cork cutting, etc. Their complete catalogue should be in the hands of every carpenter having a woodworker or expecting the purchase of one.

ECONOMY FURNACES.

There are many places where the use of a furnace and hot air heating is preferable to other forms of heating. In such a place, the Bovee furnace presents some exceptional values.

The Bovee Grinder and Furnace Works, 60 Eighth streets, Waterloo, Iowa, have very interesting catalogues, showing the construction and operation of their furnaces. The catalogue shows in great detail the path through which the heat gases pass and the novel features which give the Economy Furnaces their value.

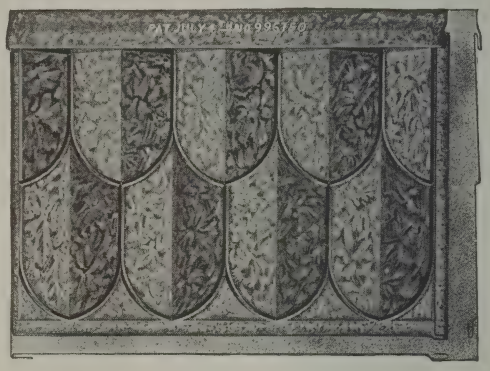


The Economy Furnace is made in a number of styles and sizes for such various conditions as residences, churches, schools, public halls, etc., and intending builders of such buildings should have the catalogue of the Bovee Grinder & Furnace Works for ready reference.

METAL SHINGLES.

No part of the building is more susceptible to ornamentation than the roof. Between the tendency to leave a roof perfectly plain and to cover it with a mass of profuse and useless ornament, there is a wide field for decoration.

The Metal Shingle Company, 318 Jefferson



avenue, W., Detroit, Mich., have designed some very neat and harmonious patterns for their metal shingle. One of them is shown in connection with this article.

Every contractor or builder having anything to do with roofing should investigate the merits of this make of shingles.

THE END OF THE PLASTERED WALL.

Just as electricity has superseded candles so has Wall Board relegated the old-fashioned lath and plaster to a rapidly vanishing place.

Carpenters and builders today demand materials that save time, money, and annoyance in handling—materials that resist destruction from any cause except the professional building wrecker.

All these things are unknown now when Bishopric Wall Board is used on a building—and by the way carpenters and builders are using Bishopric for every kind of building, from a "sky-scraper" to a poultry house.

Bishopric Wall Board is made of Asphalt powerfully toughened called Asphalt-Mastic. Into this, lath is imbedded as closely as it is ordinarily nailed to studding. The reverse (or outside) of the Wall Board is heavy, high-grade cardboard, thoroughly sized.

Builders, carpenters, and building owners are all deeply interested in learning about this article, and will be glad to know that the manufacturers, The Mastic Wall Board and Roofing Mfg. Co., 340 Este avenue, Cincinnati, Ohio, will be pleased to send to anyone who requests it, a simple method of determining just how much Wall Board or Sheathing is necessary for any purpose. They also offer a free sample of the Wall Board, as well as a beautiful Art Catalogue demonstrating and suggesting its various uses.

You have probably taken your Simonds Saw in just this same way and displayed it to the admiring gaze of some friend.

Like the fellow in the picture, you probably said—"Simonds, I tell you it's a great saw."

No, the Simonds Hand Saw isn't a very old product—even though the Simonds Co. has been in business eighty years. We made other kinds of Saws for a great many years before we yielded to the demand for a Simonds Hand Saw.

Ten years on the market has proved the Simonds Saw, has tested it, has shown the undoubted call for an extra high quality Saw. The story of public approval is shown by public demand.

Every Simonds Saw is fully warranted. Ask your hardware dealer. Tell your friends about this Saw—send for a free copy of Simonds' Guide for Carpenters. If your dealer doesn't sell Simonds Saws, write us saying what kind of a Saw you want.

SIMONDS MANUFACTURING COMPANY

Fitchburg, Mass.	Vancouver, B. C.	San Francisco, Cal.	Seattle, Wash.
New York City.	Chicago, Ill.	Lockport, N. Y.	London, Eng.
Portland, Ore.	New Orleans, La.	Montreal, Que.	St. John, N. B.

PROTECTING AND DECORATING.

Climate conditions in the United States are very severe upon all ordinary building materials. Whether the material used be brick, tile or concrete, the substances are all more or less porous and subject to deterioration. As generally prepared, the substances are not of the colors required and the question of decoration as well as preservation becomes a problem for the architect, engineer, contractor and builder.

Wadsworth, Howland & Co., 82-84 Washington street, Boston, Mass., manufacture a substance known as Bay State Brick and Cement Coating, designed to insure a uniform appearance to the walls in any desired colors and to preserve the surface from discoloration as well as preventing dampness from extending through the wall. The substance is in general use on not only brick and concrete exteriors but upon stucco and rough cast exteriors. As this coating has been used upon a great many prominent buildings, it is reasonable to supose that it possesses real virtue both in decoration and protection

Messrs. Wadsworth, Howland & Co. will be very glad to give further information regarding this material and can probably refer the contractor or builder to some job in their immediate vicinity where it has been used.

ESTIMATING FOR CONTRACTORS.

Every contractor and builder realizes that accurate estimating is the key to success in building. A mistake in estimating may cost a loss of savings of years besides greatly injuring the builder's credit.

The Gordon-Van Tine Company, 607 Federal street, Davenport, Iowa, have a special department for estimating the material furnished by their company. As they handle and manufacture practically everything required in a frame house and all of the lumber, woodwork, glass, etc., required for a brick building, this department covers a large part of the contractor's work.

The catalogue of the Gordon-Van Tine Company shows in great detail the various materials which they handle and manufacture and this catalogue should be in the hands of every carpenter, contractor or builder whether he is buying a single sash or door or in carload lots.

The "Grand Book of Plans for Everybody," issued by the Gordon-Van Tine Company, is a continuation of their good work in the building line. They have had prepared a large number of plans for bungalows, cottages and residences as well as portable houses, summer cottages, barns, garages and poultry houses. We understand that this book is sent free to intending builders as well as to carpenters, contractors and builders. The preparation of these plans has involved a very large expense on the part of the Gordon-Van Tine Company but they feel that by being able to give to everyone the benefit of the best architectural experience they are doing a real service.

The accuracy of these plans can be understood from the fact that the Gordon-Van Tine Company are prepared to furnish all of the material necessary to erect these buildings and for this reason alone the plans must be both complete and accurate.

It would be well for everyone interested in these books to write for them at once.

SAMPLE SHINGLES.

Illustrations and catalogues are very good in their way, but the Milwaukee Corrugating Co., Milwaukee, Wis., has hit upon the ideal way of posting carpenters, contractors and builders on the merits of their Titelock Metal Shingles, by sending miniature samples, complete as far as the lock and general operation is concerned and very handy for the contractor or builder to show the prospective client.

DUMB WAITERS AND ELEVATORS.

In nearly every building more than one story in height, there is occasion for carrying supplies, equipment, etc., from one floor to another. While this can be carried up the stairs, the use of a dumb waiter will nearly always do the work quicker, safer and with much less effort than any other way.

The Sedgwick Machine Works, 130 Liberty St., New York City, in their catalogue "K" describe a number of the styles of dumb waiters and elevators which they carry in stock or make to order. This catalogue is a revelation to anyone not familiar with the workings of this class of equipment and should be in the hands of every carpenter and builder, that they may be posted on the installation of these machines when occasion arises.

THE J. M. ROOFING SALESMAN.

Conservation is attracting so much attention at present that anything on the subject is of great interest. The Johns-Manville Company, manufacturing a large line of asbestos building materials, suggest that by the use of their products the fire loss can be greatly cut down.

A list of their asbestos products would seem to be enough to erect the complete building, and includes asbestos in the form of shingles, siding, sheets, pipe and boiler covering and many other products.

One of the latest materials which they are placing on the market is the J. M. Corrugated Asbestos Roofing which is designed to overcome the objections to metal roofing. This product is described in the March number of the J. M. Roofing Salesman, which we understand is sent free to contractors and builders asking to be placed on their list.

Did You Get Your Sample?

We have a free sample of this remarkable new roofing material for every carpenter and builder in the country—Have you had yours?

FLEX-A-TILE
Asphalt Shingles

are made of solid asphalt into the surface of which is imbedded chipped slate and granite. It is rolled in so substantially that it becomes an actual part of it. It can't come out—and as it is natural slate and granite it can't fade or discolor. The colors are deep red, green, gray, silver gray or brown.

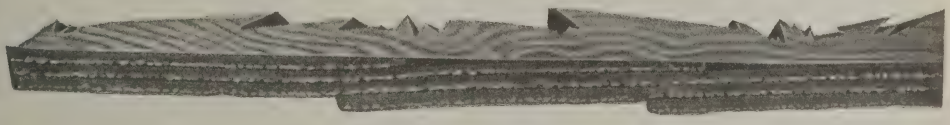
Flex-a-tile shingles are cheaper than wood shingles that have been stained. They are easier to lay and they will last as long as the house lasts.

FLEX-A-TILE COMES IN ROLLS AS WELL AS IN SHINGLE FORM

Write today for your sample and for the Flex-a-tile Book.

THE HEPPES COMPANY

1012 Forty-Fifth Avenue **Chicago, Illinois**



KEEN KUTTER QUALITY.

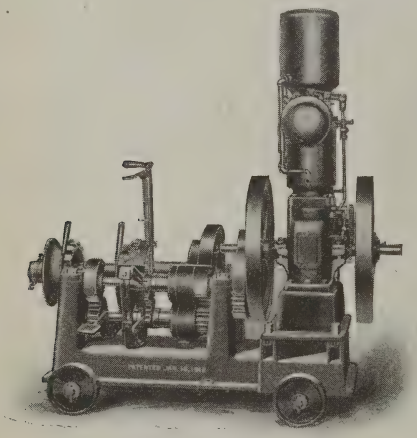
Every workman looks at tools for two qualities. First, the quality of the material and second, the workmanship. The good mechanic will carefully test the hang and swing of a hammer, saw or other tool many times before deciding just which tool he wants.

The Simmons Hardware Company, St. Louis, Mo., fully appreciate this attitude of the mechanic and have designed their tools to meet the most careful scrutiny and testing. The Keen Kutter line includes all the carpenters' and machinists' tools for the bench or home, for farm and garden, as well as scissors, shears and table cutlery.

While Keen Kutter tools are sold in nearly every city in the United States, the Simmons Hardware Company will be very glad to send their catalogues Nos. 896 and 976 to any who are interested in tools and cutlery.

THE POLYGON BUILDERS' HOIST.

The Polygon Builders' Hoist, manufactured by the Waterloo Cement Machinery Corporation, 111 Vinton St., Waterloo, Iowa, is a great advance over the old style forms of hoists



The Polygon Hoist.

and merits the fullest examination at the hands of those who desire the most modern as well as the most efficient equipment at a moderate price.

In the Polygon Portable Hoist, simplicity, efficiency and durability are obtained in a machine economical in price.

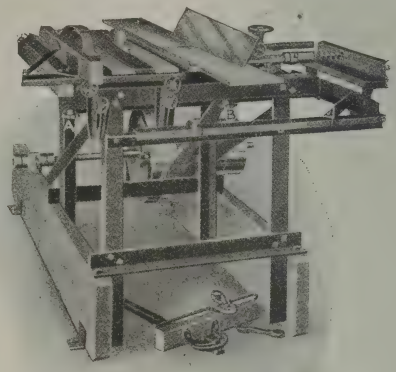
This hoist is a great improvement over the old style horse lifts, hod carriers, etc., and any contractor who wishes to make the greatest profits needs no argument as to their economy.

The catalogue of the Polygon Hoist, as well as the other equipment made by the Waterloo Cement Machinery Corporation, should be asked for by the up-to-date contractors.

THE BALL BEARING WOODWORKER.

The catalogue of the Parks Ball Bearing Machine Company shows among other things their No. 270 and 272 Single Table Circular Saw and six-inch joiner with boring or routing attachment.

This machine has a number of novel adjustments and it will be well for every contractor contemplating installing woodworking ma-



Parks Ball Bearing Woodworker.

chinery to have this catalogue and see the special prices which the Parks Ball Bearing Machine Company, Knowlton and Fergus Sts., Cincinnati, Ohio, are making at this season of the year.

GENASCO ROOFING.

The question of the selection of the proper brand of prepared roofing is one which subjects the contractor, builder and owner to a number of puzzling questions. Each manufacturer and dealer brings out reasons why his particular brand is the best.

The Barber Asphalt Company, controlling the entire output of Trinidad Lake asphalt, believe that they have the key to the situation in their Genasco Roofing. The large plants of this company insure a uniform product and their long experience should be a suf-

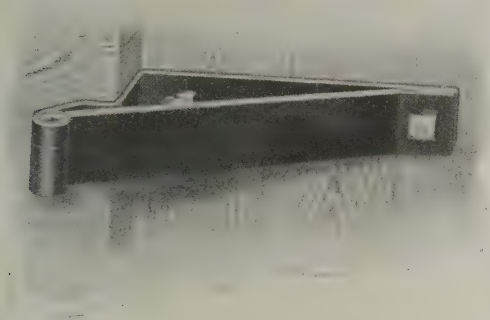
Scene on Trinidad Lake.

ficient guarantee of quality, but we understand that they are willing to give an additional personal guarantee to anyone who asks for it. This should make it a safe roofing to use.

Genasco Roofing is sold generally by dealers, but the Barber Asphalt Company, through their offices in all the large cities, will be glad to give further information regarding the character, composition, etc., of their products.

BARN DOOR BUMPERS.

Every carpenter who has installed sliding barn doors realizes the necessity for a sub-



Ill., have designed their No. 16 Barn Door Bumper, shown herewith. It will be noticed that the hanger has a hinged joint which provides a convenient method for inserting the first lag-screw and it is so constructed that stantial door bumper in order to secure the best results with sliding hangers. Bumpers made of wood do not stand the hard usage and soon become useless.

To meet the demand for a door bumper that will stand the unusual strain and jarring, the National Manufacturing Company, Sterling, it holds the door close in against the building.

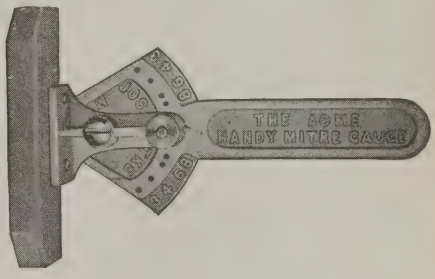
The National Manufacturing Company have a number of other novel specialties of great interest to the contractor and carpenter. A request to them will bring their complete catalogue and other valuable information.

THE ACME HANDY MITRE GAUGE.

Most carpenters are able to saw a board pretty nearly square, but when a mitre or angular cut is required, much difficulty is experienced and time lost in going to the box to get a tri-square, bevel or mitre box.

The Acme Handy Mitre Gauge overcomes this difficulty, and it is can be carried in the pocket without inconvenience.

Joseph Miotke, 249 Lake St., Milwaukee,



Wis., is the manufacturer of this handy tool as well as the Acme Floor Scraper. A line to Mr. Miotke will bring full information regarding these tools.

WILLIS
Self-Installing
SKYLIGHTS

From Factory to Builder
No Other Labor Necessary

Willis Skylights are constructed so that any person handy with a hammer or screwdriver can install them. It is not necessary to have a soldering outfit or tinners' tools.

They are shipped knocked down after being set up and tested in the factory, are watertight without the use of putty and designed to give the greatest amount of glass area. The ridge and gutter bars cannot sag, buckle or spread.

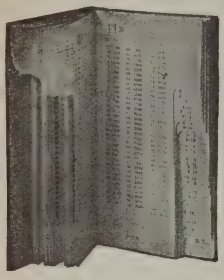
Send us your plans or a rough sketch with dimensions and we will furnish working drawings and an estimate. **You can install it yourself.**

Catalogue No. 6 gives our large line of other Sheet Metal Building Material. Send for it.

WILLIS MFG. CO., GALESBURG, ILL.

THE PERRY LUMBER RECKONER

ESTIMATING ERRORS ELIMINATED



Mistakes are impossible with the Perry Lumber Reckoner, as all the figuring is done for you.
The lumber tables give the number of board feet in any number of pieces, from one to a hundred, for all the commercial sizes of lumber. You can turn instantly to the right page. Ask your bookseller about it, or send direct.

Price, Prepaid $1.00

BENJ. L. JENKS, Pub.
906 Williamson Bldg., Cleveland, O.

BRASS RAILS

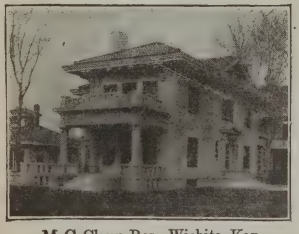
Of every description for Theatres, Churches, Offices, Etc.

HAND RAILS — BRASS FRAMES
PUSH PLATES — BRASS EASELS
KICK PLATES, Etc. — BRASS GRILLES
For Theatre Lobbies

LET US BID ON ALL BRASS WORK
Inducing Prices, High Class Workmanship
Send us list of requirements

The Newman Manufacturing Co.
Established 1882
717-719 Sycamore Street, Cincinnati, O.

143 Cities Used "STONEKOTE" Rough Cast In 1911



M.C. Clapp Res., Wichita, Kan.

Before you build or repair the old home have your architect write us for book telling of "Stonekote" Portland Exterior. What color would you like a sample to be; Gray, Silver Gray, White, Buff, Red, Brown?

THE GARDEN CITY SAND COMPANY
MANUFACTURERS
709-11 Chamber of Commerce — CHICAGO, ILL.

THE STEEL SQUARE

Two Volumes. A practical treatise on the use of the Steel Square. By Fred T. Hodgson. 600 pages, 500 illustrations. The author was the first—really the only—to write on this important tool, and the two volumes contain the easiest as well as the latest method of using the **Steel Square** for the solution of the many problems in building construction. The two volumes are of the greatest value to the young carpenter. Single Volume, Part I, cloth....$1.00
Part II..... 1.00
Two Volumes..... 2.00

Postpaid at These Prices

Hodgson Book Company
539 S. Dearborn St., Chicago

CORTRIGHT METAL SHINGLES.

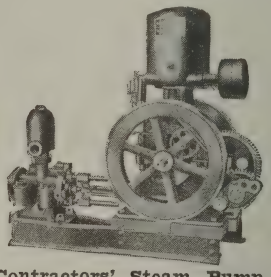
The prime requisite of metal shingles is that they must be weatherproof against rain, snow, hail or sleet. A further feature in their favor is that they are incombustible and will prevent fire entering the building through the roof.

The Cortright Metal Roofing Company have been manufacturing metal roofing for many years and their latest circular, "The Triumph of Metal Shingle Roofing," contains a number of telling arguments in favor of this form of protection.

The Cortright Metal Roofing Company have offices in Philadelphia and Chicago and will be very glad to send any desired information to contractors, builders, roofers, etc.

CONTRACTORS' EQUIPMENT.

Every contractor at times has use for a first-class pump, the size of the pump depending on the nature of the work and the size of the building, and in all cases it is advisable to



Contractors' Steam Pump.

have the pump of sufficient capacity to take care of the extreme work which may be met with.

The Novo Engine Co., 228 Willow St., Lansing, Mich., manufacture a complete line of contractors' pumps, hoists, engines, etc., embodying many novel details of construction. Their use is an economy which every contractor should consider and their catalogue should be at hand for ready reference.

THE GREYHOUND SAW.

Geo. H. Bishop & Company, Lawrenceburg, Ind., have specialized for years on hand saws of quality. Their experience along this line has resulted in the introduction of a great many styles of saws for every purpose and for special purposes. Their catalogue, showing in detail the construction, operation and grade of saws will be sent to our readers on request.

One should not trust entirely the hardware man in selecting tools for personal use. It is better to see exactly what the various manufacturers are getting out as it is more than likely that there are shapes, sizes or styles which the mechanic has never seen or heard of before which are particularly suited to him. For this reason, a line to Geo. H. Bishop & Co. will possibly be of great value to the carpenter or builder.

Alabastine

The Sanitary Wall Coating

was used in decorating the walls of these homes in preference to wall paper, paint, or any kind of kalsomine. These six homes represent **thousands** where Alabastine has proved more artistic, durable and sanitary than any other wall covering.

WHY IT IS BEST

Alabastine is best because it is durable, by that we mean that when once applied to a suitable surface, it can later be retinted and redecorated, putting succeeding coats of Alabastine over the old ones without the necessity of going to the expense or passing through the disagreeable experience of washing the walls.

Should you ever desire to wash Alabastine from your wall it can be easily done, which is not the case with paint once it commences to scale off.

Alabastine is ready to mix with **cold water** and will remain in working condition after mixing for days.

An Alabastined wall can be re-coated when soiled at less expense than to wash a painted surface.

The cost of Alabastine in regular tints for any ordinary wall surface will not exceed 1½c per square yard. The cost of applying is no more than to apply the cheapest kalsomine.

Color plans and designs for decorating any room in any home, office, store or church with Alabastine, will be supplied by our art department free of all expense to architects, carpenters and builders having charge of such work.

Beautiful cut stencils for carrying out the decorative work now so much in vogue will be furnished by the Alabastine Co., to be used in connection with Alabastine.

ALABASTINE CO.

GRAND RAPIDS, MICH.

The Northwestern Terra Cotta Company

Manufacturers of High Grade

ARCHITECTURAL TERRA COTTA

ENAMELED WORK A SPECIALTY

Main Office and Works, 2525 Clybourn Ave.
Branch Office, Room 1415 Railway Exchange

CHICAGO, ILLINOIS

A Tool Bag For You

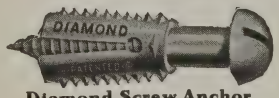
Mason's, Joiner's, Carpenter's

Mason's Tool Bag.

In fact we make Tool Bags in Canvas and Leather for every Mechanic. Want our Catalogue?

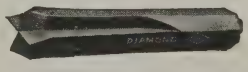
Excelsior Bag & Mfg. Co.
TROY, N. Y.

DIAMOND EXPANSION BOLTS



Diamond Screw Anchor

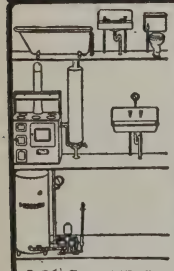
For fastening all kinds of material to Brick, Stone or Concrete.



"Diamond N" Steel Drill

DIAMOND EXPANSION BOLT CO.
90 WEST STREET, NEW YORK

WATER WORKS FOR COUNTRY HOMES $37.80



EVERYTHING KNOWN IN
Plumbing Goods
Pumps, Windmills, Etc.
DIRECT AT
Manufacturer's Prices
Send for Big Low-Price Catalog—FREE
Missouri Water & Steam Supply Company
931 S. 6TH STREET ST. JOSEPH, MO.

RAPID LOCK MORTISING.

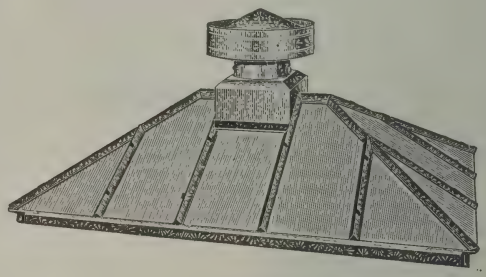
Until the Miller Lock Mortiser came into use, the customary manner of cutting a mortise for a door lock was by boring and chiseling by hand. The accuracy of the work depended upon the skill of the mechanic. With the Miller Mortiser, however, the work is more or less mechanical and extremely more rapid.

The catalogue of the Albert W. Miller Manufacturing Company, Riverside, California, shows the operation of this lock mortiser, which the manufacturers claim will cut an opening for a mortise lock in three minutes in hard, soft, cross grained or end wood and will cut it absolutely parallel with the side of the door.

Every carpenter should understand the working of this mortiser, as its use will pay for itself on a single job.

PERFECT LIGHT AND VENTILATION.

There are many places where light and ventilation can best be secured by the use of a skylight. Many suppose that the installation of a skylight requires a great deal of skill.



"Willis Self-Installing Skylight."

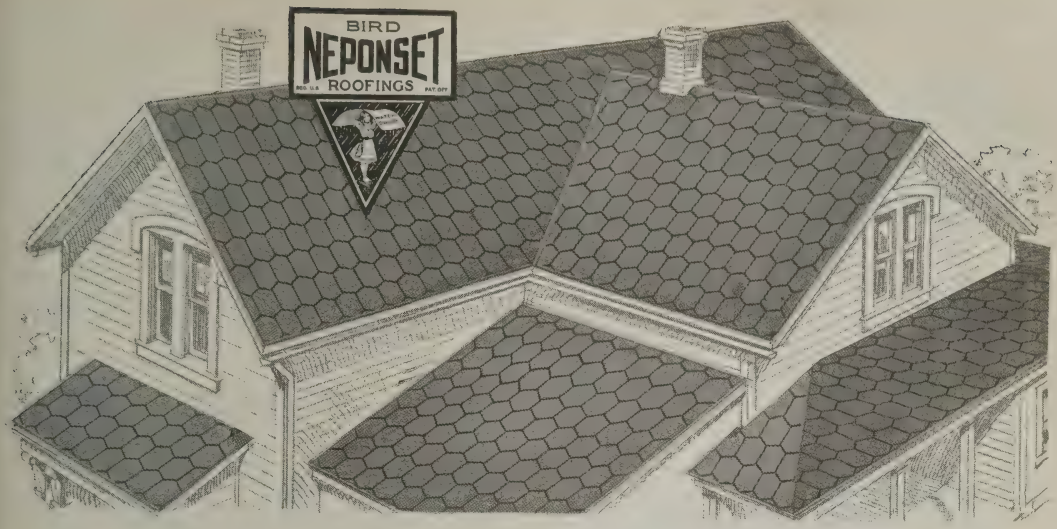
We understand that the Willis Mfg. Co., Galesburg, Illinois, are sending out their skylights in such form that the greater part of the skilled work is done in the shop and that their skylights can be readily installed by the mechanic of ordinary ability.

Their catalogue "B" shows a number of styles of skylights, ventilators, weather vanes, fireproof windows, etc., which are of interest to the builder.

YANKEE TOOLS.

The use of labor-saving tools is no longer confined to the large manufacturer. Every mechanic has, or should have, some of the simpler forms of tools which reduce the labor of carpentry and machine work as well as save time for himself and his employer.

The Yankee Tool Book, issued by North Brothers Manufacturing Co., Dept. N, Philadelphia, shows the advantage of Yankee Tools for various classes of work in the garage, machine shop, cabinet shop or on the job. These tools or tool holders will quickly save far more than their cost. Every mechanic should have this book.



Isn't This Roof Attractive?

At Last there is a really artistic roof that resists fire and is within the reach of the average man's pocket book.

NEPONSET PROSLATE ROOFING

Is a modification of the long-life roofing materials that we have been making for years, combined with a permanent colored surface. It is durable, fire resisting and moderate in price. Easily laid in laps 18 inches wide. Special fasteners make the roof an air-tight blanket without a single nail hole exposed to the weather.

NEPONSET Proslate is more attractive than stained shingles.
Made in Red and and Green colors.

Write for our special proposition to carpenters and builders. You make a profit on the material and on the job.

Get behind this up-to-date roofing **NOW.**

Branch Offices:
New York
Washington, D. C.
Columbus, Ohio

F. W. Bird & Son, East Walpole, Mass.
Established 1795
Canadian Plant, Hamilton, Ontario

Branch Offices:
Chicago, Ill.
Portland, Ore.
San Francisco, Cal.

WHITE'S WEATHER PROPHETS.

Contractors and builders are very much dependent upon good weather in order to carry on a large part of their work. Why should they guess what the weather is going to be when it is possible to obtain instruments which will forecast the weather for from eight to twenty-four hours in advance.

The David White Company, 421 E. Water St., Milwaukee, are placing on the market a unique and reliable instrument for forecasting the weather. Sent prepaid for $1.00.

The David White Co. is also well known for the manufacture of high grade engineering instruments. Their catalogue will be sent on request.

PASSENGER AND FREIGHT ELEVATORS.

Catalogue "K" from Kimball Brothers Company, Council Bluffs, Iowa, contains a great deal of valuable information regarding the installation of hand and power elevators.

Anyone who has had to work or live on several floors appreciates the labor of carrying material up and down stairs. To such, the use of a hand dumb waiter or a heavy freight car, depending on the nature of the material, becomes almost indispensable.

To a certain extent, each job has a separate problem to be solved as the materials carried, story heights, etc., are determinating factors.

The Kimball Brothers Company will be very glad to send their catalogue "K" to interested parties or to correspond with contractors or others considering the installation of this class of labor-saving machinery.

THE DOUBLE CLAW HAMMER.

Every mechanic appreciates the difficulty in pulling out nails with the old-fashioned hammer. The nail will start but will soon be bent

The
DOUBLE
CLAW
HAMMER
PATENTED
USE ONLY ONE HAND FOR HIGH NAILING
NO STRAIN ON THE ARM WHEN HIGH NAILING
PULLS THE NAIL OUT STRAIGHT
YOU DRIVE THE SAME NAIL RIGHT IN AGAIN
for the mechanic with an ambition to succeed

so as to be unserviceable for another nailing.

The Double Claw Hammer will pull a nail and pull it out straight without bending the nail and without marring the woodwork.

The Double Claw Hammer has an added advantage in that it will hold a nail securely for the purpose of high nailing. A nail can be started in this way as high as the carpenter can reach with the head of the hammer and can therefore be used in many places where a step ladder would be otherwise necessary.

The saving in time through the use of a hammer of this character will very soon pay for the slight difference in cost.

The Double Claw Hammer Company, 453 Broadway, Brooklyn, N. Y., will be very glad to send further information regarding this novel tool.

STYLE IN CEILINGS.

The Northrop, Coburn & Dodge Company, 30 Cherry St., New York, believe in originating artistic designs in art metal work. One of their patterns, known as Modern English

"Modern English Gothic Ceiling."

Gothic, is shown herewith and has been used with most satisfactory results.

Those contemplating using metal ceilings for any of the many places where its use is advisable should have the catalogue of the Northrop, Coburn & Dodge Company, which will be sent free on request.

SPECIAL SPECIFICATIONS.

The department of technology of the Glidden Varnish Company, Cleveland, Ohio, has recently prepared special specifications for the treatment and finishing of concrete floor surfaces, and for the damp-proofing, uniforming and decorating of cement and stucco surfaces, cost data being included in each set of specifications, both of which are just off the press, and we understand that the Glidden Varnish Company would be very glad to mail copies of both or either upon request.

JUSTRIGHT GALVANIZED ROOFING

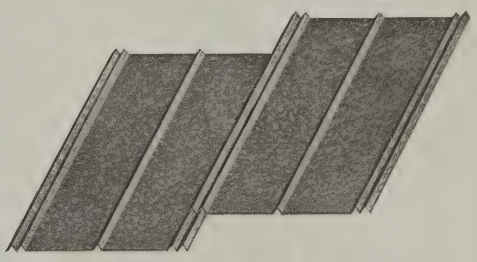
(APTLY NAMED)

That Simple Roof That Don't Leak

No Wood Strips Required.

Adapted for Residences, Barns, Warehouses, Garages, and buildings requiring fireproofing.

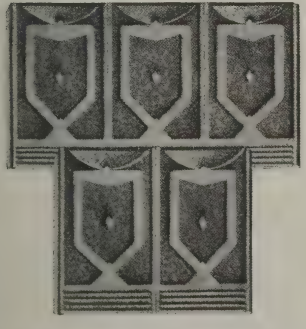
Made in all lengths to meet requirements.



STANDARD
Lock-Joint
METAL SHINGLES

Are the **quickest laid** shingles made, Mr. Contractor and Builder, and they give absolute satisfaction and service. These are proven facts, and don't ignore them.

Our metal shingles are made in either **Painted Tin or Galvanized.** They are twice as quickly applied as those of any other make. In using them you are saving time, and saving time means saving money. Can you afford NOT to investigate them?



Our Standard Lock-Joint Metal Shingles have a continuous seal at end of side-lock. It is impossible for rain, snow or sleet to blow up under them. Ours is the only shingle made having this feature. And they lock—lock so that they will always keep in one, and only one, position, contraction and expansion being provided.

Let us send you our general instruction roofing booklet. You'll find it very handy to have, and it explains all about our Standard Metal Shingles. Drop us a line about it. It's free. Further: We have an ATTRACTIVE PROPOSITION to make to Contractors and Builders in territory in which we are not represented. Write us regarding terms, etc.

The Moeschl - Edwards Corrugating Company

9th Street, Covington, Ky. (Opposite Cincinnati)

SHEET METAL BUILDING MATERIAL, INTERIOR AND EXTERIOR

Glidden

says:

WE can't tell what your taste in wood finishing may be until you let us know, but we *do* know that we are able to produce any effect you wish.

We have a special department devoted exclusively to your requirements and we will be pleased to prepare special panels for

you, such as Fumed Oak, Quartered Oak Finish, Natural, Very Dark Mahogany, Natural Mahogany or any other effect you or your client may prefer.

Every builder has his own ideas. This is what gives him individuality and individuality is what makes him. Our mission is to carry out your ideas at no expense to you.

All that we ask is that our materials be mentioned in your specifications if, after receiving our panels, you decide that the Glidden products are worthy.

The Glidden Varnish Company

Factories: Cleveland, Ohio; Toronto, Canada

Branches: New York, Chicago, London

THE KAHN SYSTEM BUILDING PRODUCTS.

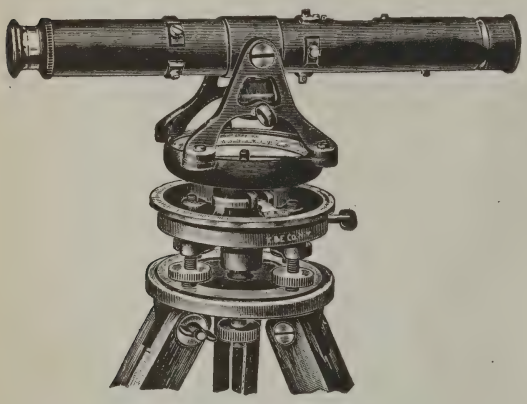
The extended use of concrete as a building material has brought forth a great number of new and useful articles of equipment.

The Trussed Concrete Steel Company, 384 Trussed Concrete building, Detroit, Mich., are manufacturers of the famous Kahn trussed bar, trussed-con wire reinforcement, hy-rib lath, steel sash, stair treads, and many other articles and materials of interest to the builder.

It would seem wise for every contractor having anything to do with concrete buildings to get their catalogue as it contains a great deal of valuable information.

SURVEYING INSTRUMENTS.

The Keuffel & Esser Company, long famous as manufacturers of all descriptions of surveying instruments, have recently placed on the



market a line of what they call surveying instruments, for the use of the builder, landscape gardener, agriculturist, road builder, etc.

One instrument known as the improved farm transit with compass, is a simple form of the engineers' transit with a good telescope, showing objects erect. The telescope may be tilted for plumbing lines and reading horizontal angles, etc., or may be used as a level. There is on the transit a horizontal circle graduated to degrees with a vernier reading to about 5 minutes. To determine the compass point, a needle and circle graduated to degrees is also on the instrument.

An instrument of this character can be used by any mechanic capable of reading the directions and who is competent to wind and set a watch.

The Keuffel & Esser Company have a very large factory at Hoboken, N. J., which insures great accuracy in the manufacture of their instruments and they also have branch offices at 111 E. Madison, Chicago, 813 Locust street, St. Louis, 48-50 Second street, San Francisco, and 252 Notre Dame street, W., Montreal, Canada. They will be glad to send further information regarding these instruments to any interested parties.

THE BLUE RIBBON SAW.

The 1912 catalogue of the Simonds Manufacturing Company, Fitchburg, Mass., contains a great many items of interest among which is the Simonds Blue Ribbon Hand Saws. The manufacturers claim that this is just about the finest thing made in saws of this character.

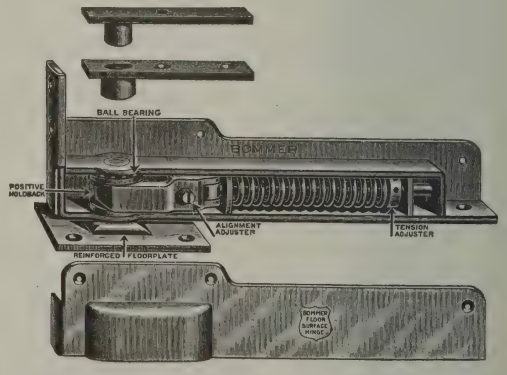
We are advised that already over 100,000 copies of "Simonds Guide for Carpenters" have been distributed and the demand for this excellent booklet still continues.

Carpenters and contractors who have not already obtained this guide should send for it without delay—not that there is danger of the issue being exhausted, but they cannot afford to be without the information which is contained in it.

BOMMER SURFACE FLOOR SPRING HINGE.

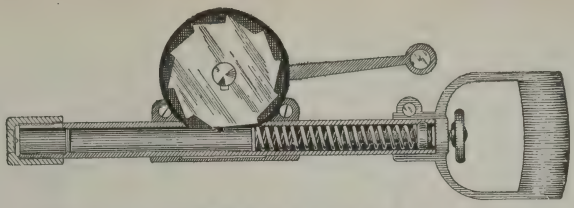
Bommer Brothers of Brooklyn, N. Y., are placing on the market a new surface floor spring hinge which possesses several unique features. In locating the hinge on the door, no hanging stile is required and the weight of the door is carried on ball bearings, which reduces the wear to a minimum.

The hinge is so constructed that it will auto-



matically hold a door open when swung more than 90 degrees and the tension spring is adjustible to provide for different weights of doors and other conditions.

Bommer Brothers also manufacture a very large line of spring hinges for various purposes and their catalogue should be read by every contractor and carpenter, as it will enable them to distinguish the good points of these goods at the stores and to assist them in installing them on the job.



PHILLIPS' SPRING HAMMER

Drills Holes in Stone, Concrete, Brick, Marble, Tile, Conduit, etc.

WILL DRILL 10 TIMES FASTER THAN BY HAND

strikes 800 to 2000 blows per minute. An indispensable tool for Carpenters, Steam Fitters, Plumbers, Stone Masons and Electricians. Simple in construction and action. Fully guaranteed. You turn the crank, the spring does the work.

Makes perfectly round and straight hole 3/8 inch to 1 1/2 inch in diameter, true to size from start to finish.

WRITE FOR PRICES AND FULL PARTICULARS

ORR & LOCKETT HARDWARE Co

Established 1872

14-16 West Randolph Street CHICAGO, ILLINOIS

BUILD BUNGALOWS

"from crest to foundation" WITH WASHINGTON **RED CEDAR SHINGLES**

They Sell on Sight

Designed by Herrick Improvement Co., Seattle, Wn.

The pleasing beauty of shingle bungalows attracts purchasers and keeps you busy. You can secure any artistic color effect you wish by dipping them in a good stain, thus saving half the painting bill on a house.

BE THE "BUNGALOW MAN" OF YOUR TOWN. IT PAYS

GET THIS FREE BOOK.—Our "Bungalow Book" shows 24 beautiful designs from actual photographs with floor plans and estimated cost. Enclose 2c stamp for copy. We have no plans or books to sell. We manufacture Washington Red Cedar Shingles, sell through local dealers only and want you to know about our product before you build.

Red Cedar Shingle Manufacturers' Association

Representing over 200 Mills
Capacity 20 Million Daily

516 White Building, SEATTLE, Wn.

14 Acres of Building Material Bargains

READY TO SHIP!

Y. P., "A" Quality
2-6 x 6-6-1⅜, $1.80

Front Door, $4.60

Mantel, $24.16

This giant establishment, the strongest and most fireproof in the West, is the largest structure of its kind in the world. It has over 14 acres of concrete floor space. It has two railroad switching tracks with triple loading platforms extending the entire length of the vast structure, with capacity for handling 25 cars at a time.

The five floors are reached by electric elevators having a capacity of almost a carload at one lift.

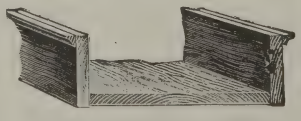
We load direct from platform to cars, without any drayage. These quick-handling conveniences, combined with our direct trackage connections with the great trunk lines, give us quick shipping facilities that are absolutely unexcelled.

Our immense warehouses are filled from roof to basement walls with vast reserve stocks of Building Material, enabling us to fill the largest orders within 48 hours after receipt of same.

Gordon-Van Tine Co.

607 Federal St.
Davenport, - - Iowa

Oak Flooring, 100 lineal feet, 52c



Oak Beamed Ceiling, 13c per ft.

Art Window, $3.75

Stair Newels
Price
$2.57

Price
$2.85

Economy Prices on SASH, DOORS Millwork and Lumber

Our prices for 1912, as announced in our latest catalog, make this "Economy Year" for Carpenters and Contractors who deal with the Gordon-Van Tine Co.

In our great five-story Building Material Plant are FOURTEEN ACRES OF BARGAINS IN HIGHEST-GRADE BUILDING MATERIAL.

Our Enormous Facilities are At Your Service

We carry on hand at all times, ready for immediate shipment, the most complete stock of sash, doors and millwork in America.

In addition to all staple styles of Windows, Doors, Mouldings, etc., we offer a vast and varied line of **special designs**, at a fraction of planing mill prices.

Compare Our Prices on Staple Items in Building Material

Y. P. Door "B"—2—6x6—6—1⅜, . .	$1.38	Turned Porch Col., 6x6—8 ft., plain cap,	$1.50
S. P. Door "A"—2—6x6—6—1⅜, . .	1.74	Corner Block, 4½x4½—1⅛, . . .	2c each
4-lt Ck. Wd., 10x16, S. S., 1⅜, . . .	.58	Base Blocks, 4½x11—1⅛, ...	4c each
8-lt. Plain Wd., 8x10, S. S., 1⅛, . . .	.54	100 lineal feet Quarter Round, . . .	25c

Corner Beads, round turned, 1⅜x4 ft, 8c each

Use Our Exclusive Stock Designs and Save "Made-to-Order" Expense

Don't pay fancy prices for special millwork for porch work, stair work, art windows, special doors, etc. Use our stock designs in **exclusive patterns** and thus secure the most artistic results while saving two-thirds of the usual cost.

BUILDING MATERIAL CATALOG FREE

Write for our Grand Free Millwork Catalog, Lumber List, etc. Learn what remarkable savings our "Economy Prices" place within easy reach. Ask for names of carpenters and contractors who buy **everything** from us.

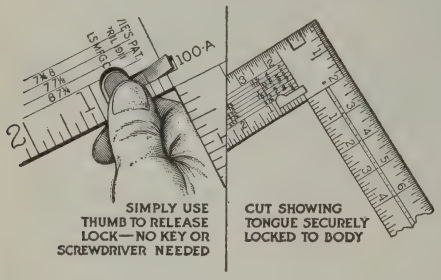
Gordon-Van Tine Co.

607 Federal St. Davenport, Iowa

186

MODERN STEEL SQUARES.

Modern methods in building require modern tools. While for many years the common steel square was sufficiently complete for the



ordinary workman, methods today require that the carpenter must be fully equipped to lay out his own work accurately and quickly.

The Nicholls Manufacturing Company, Ottumwa, Iowa, have long been known as manufacturers of the Nicholls Rafter Framing Squares, on which was given all the information necessary to find practically any rafter cut required for any roof of any pitch.

The bulkiness of the steel square in its old form, however, convinced the Nicholls Manufacturing Company that a more compact style was necessary. They, therefore, introduced their Take-Down Square, which has the same markings as the old style square, but can readily be taken apart and slipped into a canvas case just long enough and wide enough to contain the blade or body of the square. This permits the carpenter to carry his square in an ordinary tool box without the end of the tongue being exposed.

Carpenters in general have been quick to see the advantages of the Nicholls Framing Square and of the Take-Down feature. Any who are not posted on these subjects should write to the Nicholls Manufacturing Company and obtain full information.

THE SILVER STEEL FLOOR SAW.

There are many places where the ordinary saw will not do the required work. One of them is in cutting holes in flooring for alterations, etc.

E. C. Atkins & Co., the Silver Steel Saw people, have just placed on the market a new flooring saw. The use of this saw obviates the necessity for using an auger in starting a hole in the floor.

This saw is probably carried in stock by every large tool dealer, but the carpenter or builder desiring further information can obtain it direct from the Atkins Company at Indianapolis, Ind.

ROLLING STEP LADDERS.

No store equipment is complete without facilities for reaching every portion of the side walls. Where shelving extends from floor to ceiling in a high room, the Milbradt rolling step ladder is an ideal contrivance for reaching any portion of the wall.

The Milbradt Manufacturing Company, 1442 N. 8th street, St. Louis, Mo., believe that every carpenter can add materially to his income by installing rolling step ladders in the stores in his territory. While many stores can be equipped with stock sizes of ladders, there are some, of course, which would require special equipment.

The Milbradt Manufacturing Company will be very glad to have carpenters send for their catalogue No. 28 which contains practically the last word in equipment of this character.

HOISTING PROBLEMS.

One of the greatest problems which the contractor has to deal with is the moving of materials either in the quarry, transporting to the job or elevating to the various floors where the material is used. It is generally recognized that the progressive contractor must

Universal Hoist in a Stone Quarry.

use power machines of some character to do this work, as otherwise it is impossible to supply sufficient quantities of materials without undue expense for labor and a loss of time.

The Universal Hoist & Machinery Company, 180 State street, Cedar Falls, Iowa, manufacture a hoisting machine, which is particularly adapted to the use of the contractor. Although primarily designed to operate a wheelbarrow elevator, we show in a cut herewith how an ingenious quarry man uses a Universal hoist at the quarry. The owner of this rig has mounted the hoist upon a home made gas tractor and used the outfit for about a year in the quarry, and next year intends to use it to pull up a hedge which he wants to get out of the way at the least expense.

The versatility of a machine of this character should appeal to every contractor and builder and the catalogue of the Universal Hoist & Manufacturing Company should be of great interest to them.

How to Make Wall Paper Last Longer

Mr. H. A. Van Campen, Jr., of Dupree, S. D., writes: "I have sold lots of wall paper to be put on Compo-Board walls and it shows up very nicely, and in fact the paper will last much longer on it than on plaster or anything else. I have seen lots of other Boards used, but for me I would take the Compo-Board every time."

Compo-Board is the modern wall-lining. It is non-porous, and airtight—hence cold proof, moisture proof, vermin proof, fire resisting—tough and durable—outlasts the house. It is simply nailed to the studding—and is ready for decorating as soon as it's on. Saves 15 to 30 days in completing a house. Can be painted, kalsomined or papered either with or without panels.

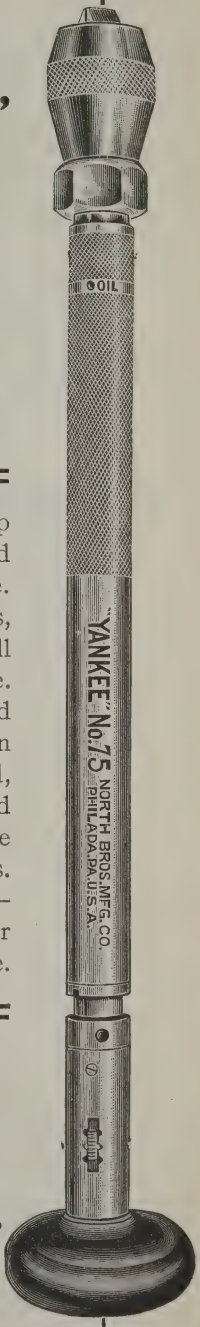
Contractors, builders and architects—if you want to deliver the most satisfactory job, in the shortest time, at the greatest profit to yourself—learn more about Compo-Board. Send your address on a postal for a sample and interesting booklet.

Northwestern Compo-Board Co.
5776 Lyndale Ave. No., Minneapolis, Minn.

Compo-Board

Another New "Yankee" Push Brace No. 75

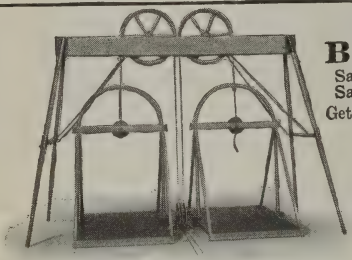
Drives Wood Augers up to ⅜-in. easier and quicker than a Bit Brace. Drives or draws screws, and takes all the small tools used in a bit brace. A fine tool for crowded corners. Bearing down on handle drives the tool, giving it the quick and easy motion of the "Yankee" Spiral Drivers. Built for good service—it's a "Yankee." Let your dealer show you one.



SEND FOR BOOK OF LABOR SAVERS

North Bros. Mfg. Co.
Dept. N
Philadelphia, Pa.

ELEVATORS
Dumb Waiters
Carriage and Store Elevators
Sidewalk Hoists, etc.
MECHANICALLY PERFECT
State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. WRITE TODAY.
Sidney Elevator Mfg. Co., Sidney, Ohio


Wise Builders
Save Dollars by Saving Minutes
Get wise to the time and labor saving features — the simplicity, durability, easy running, quick set up and knock down and other advantages of the POLYGON
MATERIAL ELEVATOR
WATERLOO CEMENT MACHINERY CORPORATION
111 Vinton St., Waterloo, Iowa

IMPROVED QUICK & EASY RISING Steam, Electric and Hand Power Safety—

ELEVATORS
and Dumb Waiters, Automatic Hatch Gates. SEND FOR CIRCULARS.
KIMBALL BROS. CO.
COUNCIL BLUFFS, IOWA

"RELIABLE ERIE" PORTABLE Contractors' Hoists
Are simple, compact, absolutely reliable and easy to handle. Sold with or without long frame on which you can mount gasoline engine or motor. A High Grade Hoist at a price that will surprise you. For operating material eleveators, pile drivers, hoisting timbers and general construction work. We furnish our hoists complete with our Economy Portable Gasoline Engines, rope, tackle, blocks, etc., if so desired. They pay for themselves on a single contract.

Write today for our Catalog H1.
Friction Clutches Pulleys Cut-Off Couplings
ERIE CLUTCH & PULLEY COMPANY
Established 1873 ERIE, PA., U. S. A.

CONCRETE MACHINERY.

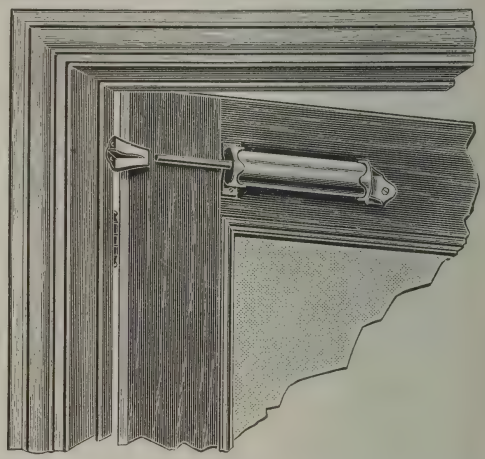
Concrete and cement products have become such a necessary part of our building operations that considerable time and effort is spent in standardizing the work in connection with it.

A new circular from the W. E. Dunn Manufacturing Company, 4135 Fillmore street, Chicago, Ill., shows a complete line of machinery, forms and molds for the manufacture of blocks, porch details, chimney caps, sills, steps, drain tile, etc.

The tile machine manufactured by the Dunn Company is of especial interest to those in agricultural districts, where drainage is a necessary part of the farm culture. By the Dunn process tile can be manufactured very fast and reasonably, and an extremely durable product obtained. This circular, as well as the general catalogue of the W. E. Dunn Manufacturing Company, will be sent free on request.

HARDWARE SPECIALTIES.

The 1912 catalogue of hardware specialties issued by the Caldwell Mfg. Co., 2 Jones street, Rochester, N. Y., illustrates a number of novel specialties for builders' use. Among others is



the Caldwell Improved Screen Door Check, as illustrated herewith. This is a simple device to prevent slamming.

The catalogue describes this check in detail as well as several other exclusive specialties.

STANLEY TOOLS.

Catalogue No. 34 of the Stanley Rule & Level Company, New Britain, Conn., is a complete mechanic's reference book, showing United States Standard rules, plumbs and levels, iron and wood planes, try-squares and bevels, bit braces, mitre boxes, screw drivers and miscellaneous improved woodworkers' tools. There is also a vast amount of miscellaneous information such as weights and measures, nails, slate shingles, skylight glass, floor loads, etc., which the users of carpenters' and mechanics' tools will certainly appreciate.

This catalogue is sent on request and will be of great interest to the users of fine tools.

BUFFALO WIRE WORKS CO.

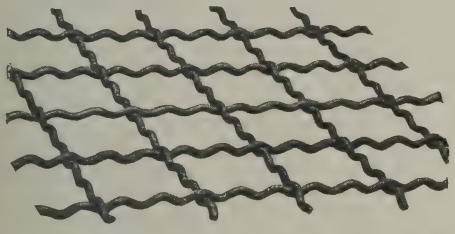
FORMERLY

Scheeler's Sons

Manufacturers of

WIRE CLOTH

Crimped Wire Concrete Reinforcement, Plain and Galvanized, in all size meshes and Gauges of Wire.



WIRE WORK

Plain and Galvanized Wire Lathing, also Grimm's Galvanized Corrugated Wire Lathing.

Buffalo Wire Fencing.

ARTISTIC METAL WORK

AGENTS FOR

Clinton Electric Welded Fabric

Samples and Prices Upon Application

SEND FOR OUR No. 5 CATALOG.

442 TERRACE

BUFFALO, N. Y.

Protect Your Concrete With Bay State Brick and Cement Coating

It is being specified by the leading architects and contractors not only as a coating on cement, stucco and brick surfaces to protect them against moisture, but on high grade interior work on both wood and plaster.

When you need a coating for cement and want something that will stand up and give protection and durability, also a pleasing finish, use the **Bay State Brick and Cement Coating,** which is the result of research and experimental work for more than a decade. Wherever it is used on stucco, concrete, wood or plaster, it stands up better than any other.

You know how necessary it is to protect concrete surfaces against dampness. My coating is dampproof and gives a pleasing appearance without destroying the texture of concrete and in addition is a fire retarder.

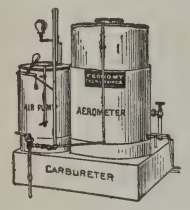
Write for particulars about **Bay State Brick and Cement Coating.** Address for booklet No. 10,

Wadsworth, Howland & Co., Inc.

Paint and Varnish Makers and Lead Corroders

82-84 Washington Street Boston, Mass.

Automatic Safe-Sanitary Gas Light and Fuel



Best for cooking and heating water for kitchen, bath and laundry.
No charging, no cleaning.
No generating, no dirt, soot, fuss or muss.
Cheaper than electricity, cleaner and safer than kerosene or acetylene (in use 16 years.)

Today is the time to write HOME department of
ECONOMY GAS MACHINE CO., 437 E. Main St., Rochester, N. Y.

MR. CARPENTER AND BUILDER! WHY NOT MAKE some extra money?

by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **Rolling Ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary to send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

Write For Catalogue

Milbradt Manufacturing Company
1442 N. Eighth Street ST. LOUIS, MO.

DUMB WAITERS
FREIGHT ELEVATORS
PAVEMENT LIFTS

Easy to Erect and Easy Running

J. G. SPEIDEL
Reading, Pa.

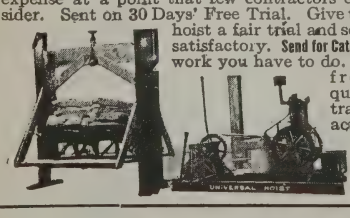
Catalogue Upon Application

Special Hoist for Contractors and Builders

Lessens operating costs and increases profits. Saves time, money, labor. Easy to operate. Costs little. Durable. Does any kind of work that any hoist can do. Saves enough on one job to pay for itself.

Helps you make low winning bids because it cuts your expense at a point that few contractors consider. Sent on 30 Days' Free Trial. Give this hoist a fair trial and send it back if unsatisfactory. **Send for Catalog.** Tell us what work you have to do. We'll send you free catalog and quote you an attractive price on exactly the kind of a hoist you need.

Read This
We have recently furnished Universal hoists material for the new brick building and your Universal Hoist has fully met the requirements. We have saved enough time and expense on this job to more than pay for it and the outfit is still in excellent condition. Blackhawk Construction Co., Waterloo, Iowa.



UNIVERSAL HOIST AND MFG. CO., 180 State St., Cedar Falls, Ia.

OAK FLOORING.

In order that the carpenter or contractor may know the best methods of laying oak flooring, as well as the advantages of this material, the Oak Flooring Bureau, 877 Hammond Building, Detroit Mich., has issued a special booklet, which is of great interest to the builder. It contains a great deal of valuable information and can be procured free by our readers.

CEMENT BRICK.

The Crescent Vertical Tamping Brick Machine, as made by the Raber & Lang Mfg. Co., 819 Mill St., Kendallville, Ind., is one of the most complete machines for this character of work.

The manufacture of cement brick has always been attended by a number of undesirable features, which the Crescent machine entirely eliminates. The catalogue of the Raber & Lang Co. is worthy of careful study.

AMUSEMENT PLACES.

The Kanneberg Roofing & Ceiling Company, Canton, Ohio, have recently issued a special edition of their catalogue, showing the use of stamped metal products for amusement places, such as sheet metal ceilings, side walls and fronts for small theaters, skating rinks, stage decorations, etc.

State and municipal laws are being inforced so rigidly that only proved fireproof and incombustible materials should be used and nothing is much more appropriate for this purpose than stamped metal.

This particular catalogue is of great interest to anyone contemplating the planning or erection of buildings of this character and the Kanneberg Roofing and Ceiling Company have a special service department to assist the architect, contractor or builder in designing and equipping buildings of this character.

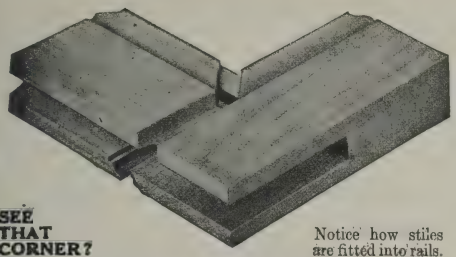
TRUE STORIES.

This instructive little booklet should be in the hands of every contractor and builder.

Messrs. Mack & Company, Browns Race, Rochester, N. Y., have been distributing these books for some time but they are anxious to have one of them for every carpenter in the United States.

Besides describing the tools which they make themselves, there is a vast deal of information regarding the care and sharpening of all edged tools and a more or less technical description showing how the quality is arrived at by the manufacturers.

It is interesting to know that Mack & Company's tools are so favorably known that they have a large market for plane irons, etc., for makes of planes and tools other than their own. This is perhaps the highest compliment which can be paid a manufacturer by others in the same line.



Notice how stiles are fitted into rails.

MADE TO ORDER

Fly Screens and Screen Doors

We use the best grades of wire, black enamel, galvanized, pearl and copper bronze, fastened by the improved **Standard Shoulder Strip Method,** which makes the wire drum tight and firm, can not sag or pull away.

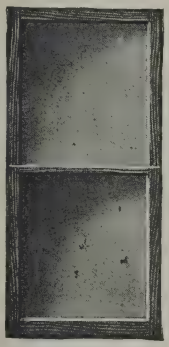
Dealers, Carpenters, Contractors and Builders, write for a free copy of our 1912 illustrated catalog

STANDARD SCREEN CO., 1848-50 W. 14th Street Chicago, Ill.

Our screens are all mortised, tenoned, joined with waterproof glue and pinned with steel pins, will last a lifetime

Investigate Before You Buy

and you will find we can save you lots of money on anything in the line of HIGH-GRADE sash, doors, frames, blinds, mouldings, inside trim, grilles, colonnades, stair and porch work, mantels, grates, tiling, art glass, paints, roofing and building papers, wall boards, hardware, hardwood and parquetry flooring, rolling partitions, screens, steel ceilings, gutters, shingles, etc.



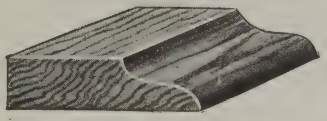
WINDOWS
42c and up

Our new catalog mailed free will convince.

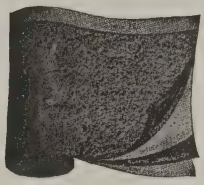
Prompt shipments and materials all first-class.

Let us send you our SPECIAL FIREPLACE CATALOG—showing unusual values.

The Huber Builders Material Co.
39-43 Vine Street CINCINNATI, OHIO



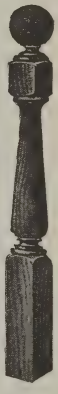
WINDOW BEAD
Best Yellow Pine
27c per 100 lineal feet



ROOFINGS
64c and up

STAIR NEWELS
$1.50 and up

HARDWOOD MANTELS
$3.58 and up



PORCH NEWELS
42c and up

Herrick Refrigerators

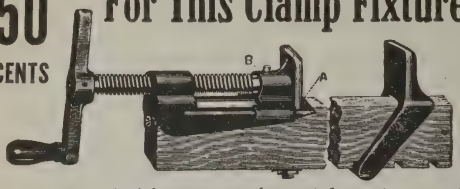
Are fully described in our Booklet No. 41 with blue prints that are of value to every architect, contractor and builder.

The best possible construction, circulation and insulation are embodied in every Herrick Refrigerator, whether it's from our varied stock or built to conform with architect's specifications. Every builder should be posted on the **Herrick** line and take advantage of our policy of co-operation.

Write for particulars and for a copy of the latest HERRICK catalog.

HERRICK REFRIGERATOR CO.
WATERLOO, IOWA

50 CENTS For This Clamp Fixture

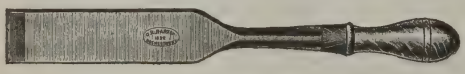


It is unequaled for strength, quick action, and lasting qualities.

Write for catalog of Sheldon's Clamps and Vises

E. H. SHELDON & CO. 178 Nims St. MUSKEGON, MICH.

Last a Lifetime and Give Satisfaction to the End!



The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalog. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book, "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

D. R. BARTON 1832. ROCHESTER, N.Y.

MACK & CO., Sole Makers

Brown's Race Rochester, N. Y.

BOMMER SPRING HINGES

ARE QUALITY GOODS

Reject Substitutes. The Springs Never Go Lame

Spring Hinges lead the strenuous life in Builder's Hardware; no other article in their line endures such wear and tear; therefore don't err in judgment, use BOMMER SPRING HINGES; they stand up to their work.

This Trade Mark on Every

Genuine Bommer Hinge

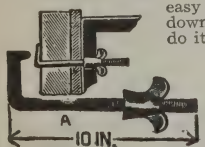
For Sale by All Hardware Merchants

$13.95 PER DOZ.

(If You Send Cash With Order)

Absolutely Safe,

for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.



The Taylor Steel Scaffold Bracket

Write for Catalog of Builders' Specialties

James L. Taylor Mfg. Co.

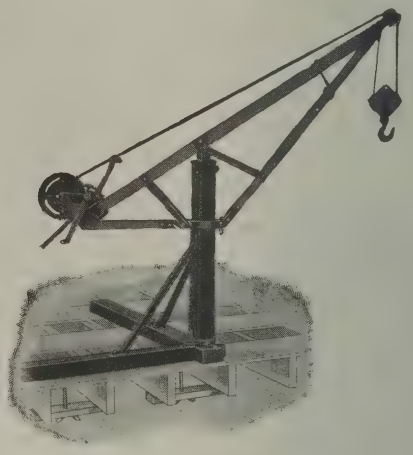
Poughkeepsie, N. Y.

MEASURING TAPES AND RULES.

Catalogue No. 8 of the Lufkin Rule Company shows in great detail the large line of engineer's, surveyor's, contractor's and builder's tapes which they manufacture, as well as various other lumber rules, gauges, etc. Their catalogue is of interest to everyone having any use for any kind of a measuring device.

THE CIRCLE SWING DERRICK.

A great deal of small material must be taken up on even a comparatively small building. This material, such as flooring, window frames, timbers, etc., is not easily taken up on an elevator or by the other ordinary means of raising and in places like this, the Sasgen Reinforced Circular Swing Builders' Derrick is of inestimable value. It can be used for building and structural work, loading and unloading cars and wagons from platforms, well digging and various other purposes. As ordinarily constructed, it has a capacity of 2,500 pounds and can raise this amount 300 feet.



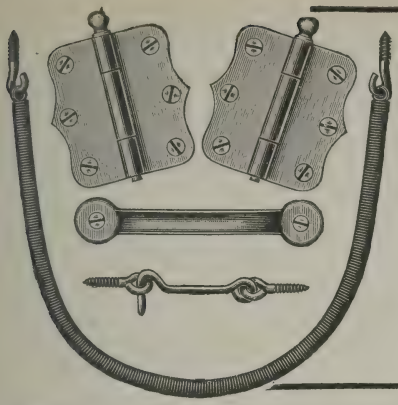
The same derrick can be easily arranged to operate either by hand or power.

A line to Sasgen Brothers, 2053 Racine avenue, Chicago, Illinois, will bring full particulars regarding this derrick.

WOODWORKING MACHINERY.

Catalogue No. 67 of the W. F. & Jno. Barnes Company, Rockford, Ill., contains a great deal of information of value to the woodworker. It shows very completely the various foot, hand and steam power machines manufactured by this company and illustrations of the work which can be done on them.

Every mechanic contemplating purchasing woodworking machinery of any character should have this catalogue and learn the favorable terms under which the machines are sent on trial.



STANLEY'S
SCREEN DOOR HARDWARE

Complete Sets in Convenient Packages

One pair of Ornamental Surface Butts; One Wrought Steel 5-inch Pull; One Gate Hook and Eye; One high grade No. 3 Steel Spring, all in a neat box with the screws to put them on the door.

Ask for Stanley's Set No. 1750 or

write us for attractive circular "N1" giving full information.

THE STANLEY WORKS New Britain, Conn. New York Chicago

We Printed a Copy for YOU

and every other builder who is interested in RICHARDS ball bearing trolley hangers for public and private garages, etc.

Our booklet "Garage Door Equipment" tells an interesting tale about sliding door hangers, door guides, overhead trolley carriers for the public garages having repair department.

Shall we send booklet and prices so you can estimate on their requirement?

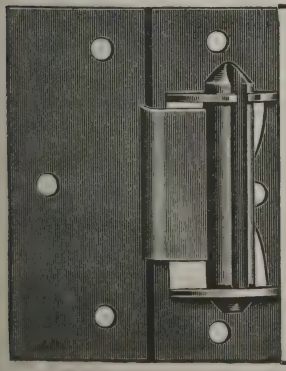
29½ B Ball Bearing Trolley Hanger

Richards-Wilcox

MANUFACTURING CO. AURORA, ILL. U.S.A.

Memorize this:

A hanger for any door that slides.



Diehl's Separable and Reversible Hinge No. 20
Is Designed For Storm and Screen Doors

Door may be swung at right angles and lifted from its bearings without removing screws, as the shank slides through the small slot in the upper ear so that it makes it very easy to change from storm to screen doors and from screen to storm doors without removing the hinges. They are made of open hearth wrought steel 14 gauge, finished in black baked Japan or oxidized copper.

A Sample of these Hinges will be sent upon receipt of 25 cents in stamps

MANUFACTURED BY THE

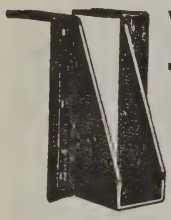
DIEHL NOVELTY COMPANY, SHEBOYGAN, WIS.

Regal Sash Cord is always marked with **Two Blue Strands.**

This sash cord has been approved by the United States Government and many leading architects. It will outwear the best chain 3½ times. It is perfect in construction and, therefore, without waste. *Send for the surest test, that made by the Government, and for free samples.*

Puritan Cordage Mills

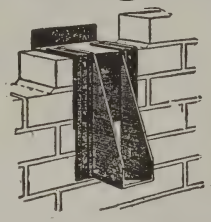
1560 Story Ave. **Louisville, Ky.**



Van Dorn's Steel Joist Hangers

Have no Equals

Send for Catalogue



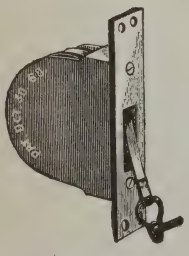
No. 1. Steel Joist Hanger for Wood Header.

No. 4. Steel Joist Hanger for Brick Walls

Van Dorn Iron Works

Cleveland, Ohio

Caldwell Sash Balance



Does away with weights and cords and **vastly** more durable. Makes sashes work perfectly. Permits greater window space in new work, as box frames are not necessary. May be applied to old windows without altering sashes or frames.

Write for Circular to the

Caldwell Mfg. Company

2 Jones Street Rochester, N.Y.

TO KEEP OUT DAMPNESS

Paint Your Concrete and Brick Buildings with TOCH BROS.

R. I. W. PAINT

"Remember It's Waterproof"

and your cement floors with **TOCH BROS. Cement Filler** and **Floor Paint,** Pat'd. Proof against Water, Acid, Fumes or Alkali. **Special elastic compound for each specific purpose**

The Garden City Sand Co.

709-711 Chamber of Commerce, Chicago

STEEL MEDICINE CABINETS.

In every household we find a large number of household remedies, liniments, etc., for the use of the family. As a rule these are scattered through every room in the house.

To bring these all together where they can be instantly found in case of emergency it has been customary to build small wood cabinets. During the last few years, however, the Hess Company, 907L Tacoma building, Chicago, Ill., have been placing on the market a steel medicine cabinet which has been a great success. On account of their completeness and being read to install in the building, they are being used in the finest buildings, not only in this country, but England, Mexico, Cuba, Canada, etc.

The Hess Company will be very glad to hear from contractors, builders, owners, etc., regarding the installation of these cabinets.

STAY-LOCKED COLUMNS.

The recently issued catalogue of Stay-Locked Columns, as manufactured by the American Column Co., Battle Creek, Mich., will be sent free to anyone upon receipt of a postal.

The catalogue is profusely illustrated with beautiful half tones showing homes ranging in price from $2,000 up, in which these columns have been used. It also shows the five orders of architecture and is a book that will be of great value to any architect, builder, or, in fact, anyone interested in building artistic homes.

FLOOR SMOOTHERS.

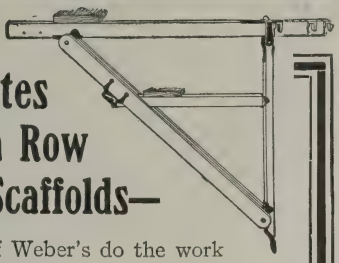
The last few years have seen a great advance in construction generally, but in no line more than that of obtaining hardwood floors with a perfect surface. While this could formerly be done laboriously by hand, the introduction of mechanical scrapers has greatly reduced the cost of this work and greatly improved the quality.

The Triple A Machine Company, 24 N. Clark street, Chicago, Ill., manufactures exclusively the Triple A machine. This machine differs from other floor scraper machines principally owing to the fact that it is the only one made equipped with spring power. This power meets the demand for a machine heavy and powerful enough to surface the floor rapidly. The machine can be used on buildings under construction and which are not ordinarily equipped with electricity or other forms of power and for this reason appeals strongly to building contractors.

The manufacturers claim that the spring motor power of the Triple A machine trebles the capacity as compared with using it without a spring and that this comparison holds true as against other hand power machines.

The Triple A Machine Company would be glad to hear from carpenters or contractors having floor surfacing problems.

The WEBER Double Folding Scaffold Bracket



Eliminates Extra Row of Scaffolds—

Two rows of Weber's do the work of three rows of common brackets. Fit any building. Especially fine for frame, cement block and brick veneer

Very Light
Very Strong

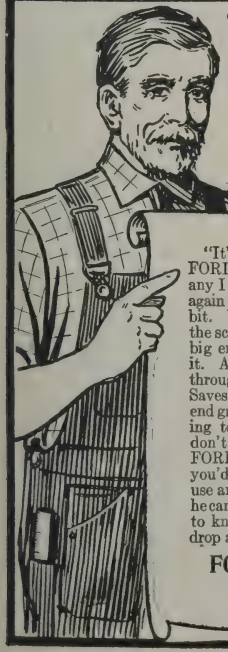
Can't swing. Thoroughly guaranteed. Money back if not satisfied.

Write for prices and full description.

JOHN F. WEBER, Pres.

Weber Manufacturing Co.

661 71st Avenue WEST ALLIS, WISCONSIN



"I TELL YOU BOYS The FORD Twist SAVES THE WRIST."

"It's a wonderful bit this FORD Single Lip. Beats any I ever used. Bores half again as easy as any other bit. You ought to see how the screw draws in, why if the hole was big enough 'twould draw you in after it. And listen, you can bore straight through any wood. Yes, sir, it's a fact. Saves me lots of time, I'll tell you. Bores end grain and lignum vitae, too. Nothing to the imitations, though. They don't do the trick like the GENUINE FORD—don't last as long, either. Wish you'd try one. I'll warrant you'll never use any other. If your dealer hasn't it he can easily get it for you. If you want to know more about this splendid bit drop a line to the

FORD AUGER BIT CO.
Holyoke, Mass.

Really Good Paint Saves Time and Money

Take two brushfuls of paint—one of "High Standard" and one of any other brand—and see for yourself how much **further** "High Standard" goes. And remember—it's not the **thickness** of the coat that gives protection, but the **impenetrability** of the coat.

Lowe Brothers
High Standard
Liquid Paint

"The Paint of Performance"

spreads more easily, goes further, sets more firmly and lasts longer than other paint. It is most economical and satisfactory to the painter and the house owner.

Lowe Brothers'

Mellotone

The modern interior wall covering —is the most beautiful of all flat wall finishes and is washable, hygienic and durable. Send for sample color cards.

GET OUR FREE BOOKS. On request we will send "Paint and Painting" and sample cards of these and other "High Standard" products. There's a Lowe Brothers Paint, Varnish, Enamel or Stain for every purpose.

The Lowe Bros. Co.
473 E. Third St., DAYTON, OHIO

Boston, New York, Chicago, Kansas City
Lowe Brothers, Limited, Toronto, Canada

We Want the Man Who Knows

good architecture and wants modern, up-to-date plans to send for our new book

"HOMES OF CHARACTER"

which contains plans, descriptions and accurate cost estimates of 40 artistic and **practical** Bungalows, Cottages and Houses. This book is full of new ideas for the wide awake contractor or home builder. **Send postpaid for $1.00. Descriptive Circular 2c.**

JOHN HENRY NEWSON (Inc.), Architect
1238 Williamson Building Cleveland, Ohio

HAVE YOU POWER BORING MACHINES?

IF SO, No Sash Pulley Can be Classed with the

Grand Rapids No. 12

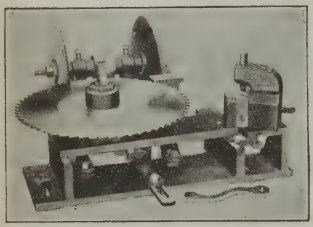
Mortised at one Punch with the **Quadruple Bit**

or bore four holes with a single bit and it's done.

No cutting, fitting nor trimming. Saves time and money. Write for Free Samples.

Quadruple Bit, Price $5.00
Can not be used in a hand brace.

Grand Rapids Hardware Co.
118 Pearl St., Grand Rapids, Mich.



THE CONRAD

SAW TOOL

Is a big money saver for Contractors, Builders and Millmen.
An inexperienced ordinary mechanic can

Gum, Joint, Set and Sharpen Circular Saws Easily and Perfectly

¶ The Conrad 14 inch machine handles saws from 5″ to 24″ in diameter and occupies only an 18 inch square.

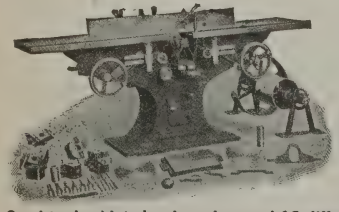
¶ Price so low no one can afford to send saws away for repairs.

Write for Circular N, and Special Offer.

H. G. CONRAD, 709 So. Clinton St., Chicago, Ill.

THE No. 10 ROYAL STANDARD

UNIVERSAL WOODWORKER



Requires but little power. It will enable you to fill orders quickly. You will seldom get a piece of work that you cannot handle on it. Order a Universal Woodworker now, and let it begin to pay for itself.

Send for booklet showing why—and 19 different views of work being run through machine

CORDESMAN-RECHTIN CO.
10 Butler Street CINCINNATI, OHIO

THE BARRETT SPECIFICATION.

Good roofs are the final word in the protection of the building and its contents. The smallest leak may ruin the appearance of both exterior and interior and may damage the contents beyond repair.

With the intention of preparing a standard specification which should be a guide for the architect in the preparation of specifications and for the contractor and roofer in performing the work, the Barrett Manufacturing Company have prepared specifications for roofs of various characters and issue copies of these specifications to those interested in good roofs.

The effect of the Barrett specification has been to standardize the work. If it were more generally followed, slag and gravel roofs would give better satisfaction and everyone from architect to owner would share in the benefit which would result. These specifications were prepared after a careful study of the subject and are designed to produce a roof which shall be economical in the use of materials and permanent, with the longest wear for the lowest cost. A roof which gives good service for only a few years is far more expensive than one which lasts several times that long. The feeling of security which comes from a good roof is alone worth the slight difference in cost over a roof of uncertain character.

The Barrett Manufacturing Company has offices in all of the principle cities, including New York, Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburgh, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle, London; Canadian offices in Montreal, Toronto, Winnipeg, Vancouver, St. Johns and Halifax and a line to any of these will bring copies of the specification and other valuable information on roofing objects.

NEW NAILING MACHINES.

The Pearson Manufacturing Company, Robbinsdale, Minn., advise us that they will soon have, in addition to their present nailing machines, a machine for handling four, six and eight ounce tacks and that machines for handling larger tacks will be made to order.

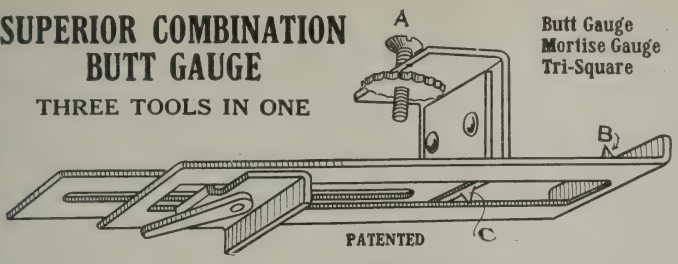
The success of the Pearson Shingle Nailer as a labor-saving invention, has warranted the Pearson Company in designing these new tools and we believe that they will have a ready and large sale.

Every contest in which the Pearson nailer has been entered has demonstrated the ease and rapidity with which the nails can be driven, 125 nails per minute being the average number which the carpenter drives in ordinary use.

The Pearson machines are in general sale at dealers in hardware and tools, but the manufacturers will be glad to send Catalogue "N" to any carpenter who would like further information, or cannot get the machines at his local dealers.

SUPERIOR COMBINATION BUTT GAUGE

THREE TOOLS IN ONE



Butt Gauge
Mortise Gauge
Tri-Square

The only Butt Gauge on the market that can be applied to both **Rabbet** and **Stop Jamb** work.

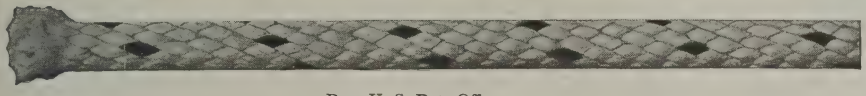
Carpenters and Cabinet Makers can perform more work with greater ease than with any other Butt Gauge on the market.

Cut out this advertisement, take it to your dealer, and if he cannot supply you, send us **85c** (P. O. or Express Money Order) and we will mail you one postage paid.

MANUFACTURED AND SOLD BY

THE GILLIAM MANUFACTURING COMPANY, Canton, Ohio

SAMSON SPOT SASH CORD



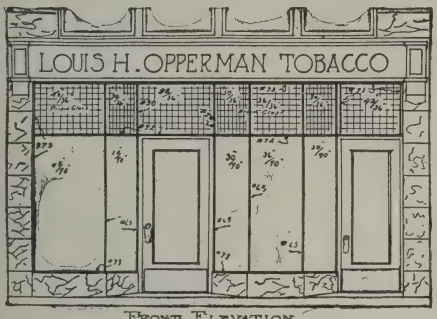
Reg. U. S. Pat. Off.

is the best that we can make after forty years' effort. It is guaranteed by the Samson Cordage Works to be free from imperfections of braid or finish, and it will last longer than any other device for hanging windows.

Our trade mark on the label is Samson and the Lion **in any color.** The Spots **in any color** are our trademark on the cord, used by us for 18 years to show, after the label is removed, who guarantees the quality of the cord. You recognize either of these marks by the design, not the color. Don't be misled by imitations.

Reg. U. S. Pat. Off.

SAMSON CORDAGE WORKS, - Boston, Mass.



FRONT ELEVATION.

You Can Be Perfectly Safe

When you use or specify **Petz Bars,** you have the satisfaction of knowing that you are using the recognized standard construction for metal store fronts. They are strong and rigid, ventilate perfectly, and have never been known to break glass.

EASY TO INSTALL

Leading architects, builders and merchants have found the Petz Bars exactly suited to their requirements. Send for our booklet, "Metal Store Front Construction," and we will leave the rest to your judgment.

Detroit Show Case Co., Sole Makers

481 Fort Street West, DETROIT, MICH.

Full Line of Plumbing Supplies

Sold Direct at Wholesale Prices

20 to 40 per cent Saving

Complete bathroom outfits—tubs, closets, lavatories, kitchen sinks, etc. Prompt shipment from a complete stock. The only house selling up-to-date, guaranteed goods at wholesale direct. Write for illustrated catalogue and prices.

B. Y. KAROL, 768-72 W. Harrison St., Chicago, Ill.

Particular Builders

Architects and everyone interested in building artistic homes and pergolas should have a copy of our beautiful Design Book of

STAY-LOCKED COLUMNS
DO STAY LOCKED

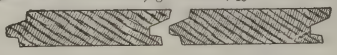
They cost no more than those flimsy, shapeless stock columns some dealers may try to sell you.

Write today, the book is free

AMERICAN COLUMN COMPANY
DEPARTMENT A BATTLE CREEK, MICHIGAN

XLCR BIRCH, OAK and MAPLE FLOORING

3/8" and 13/16"



Good Grades—Perfect Manufacture—Thoroughly Kiln Dried—Reliable in every way—Easiest to lay. Thirty-five years experience manufacturing flooring.

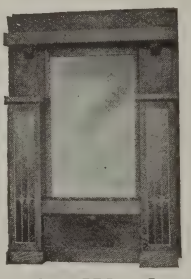
Specify XLCR Flooring and Buy It From Your Dealer.

Prepaid Free Sample Sent on request.

OSGOOD & BLODGETT MANUFACTURING CO.
Duluth Ave., near East 7th ST. PAUL, MINN.

CONSOLES, COLUMNS, and GRILLES

add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.



SEND FOR CATALOG No. 17

It contains many beautiful designs of Consoles, Columns and Grilles

Northwestern Grille Works
Office and Showroom, 1824 Milwaukee Ave., CHICAGO

CUSTOM MADE FLY SCREENS

Our work is far superior to the usual output of local mills and has a style and finish not obtainable from those who do not make a specialty of FINE SCREENS.

Our screens are made from kiln dried lumber and have water-proofed coped joints and the frames are weather-proofed before the finishing coats are applied. Best grades of Wire Cloth, Enameled Galvanized, Genuine Bronze, fastened by most approved methods. Our new "Ironwood" Screen is the cheapest good Custom Made Screen yet produced. Intending purchasers may have free by mail sample of woods, finishes, wire cloth, and a copy of catalog. Agencies in nearly all large cities. Agents wanted in smaller cities.

Special Terms to Contractors and Builders. Delivered prices will be quoted. Goods laid down at your railway station:

A. J. PHILLIPS & CO., Le Roy Street Fenton, Mich.
28 Years Experience. 3½ Acres of Floors.

KEEP THE MEN IN MATERIAL.

Only those who have been in the manufacturing business for a number of years realize the great advance in labor saving and time saving machinery.

Only a few years ago the only power appliance to raise material was the old fashioned pulley block, using one or two horses, with a comparatively short lift and limited capacity.

Only twenty years ago at the World's Columbian Exposition, a great bulk of the material was raised with rigs of this character, only the steel and heavy timbers being raised by steam power. Today no contractor or builder considers his equipment complete without a power hoist capable of running either an elevator or a derrick of some description.

Certain classes of work, such as stone, steel, heavy framing, etc., can be best raised by a derrick, while the looser materials, such as brick, mortar, cement, concrete, tile, etc., are generally taken up in a temporary elevator.

The Erie Clutch & Pulley Company, Erie, Pa., have designed a portable friction hoist to take care of all classes of building work. The machine is made in several sizes, having capacities from 500 to 2,000 pounds and can be had either with the hoist alone or equipped with a portable gasoline engine. The latter arrangement makes a complete power plant for all ordinary buildings.

The time alone saved by getting material up rapidly and in sufficient quantities will pay for a hoist of this character on a small job and every contractor should have a machine of this character.

The Erie Clutch & Pulley Company are among the early manufacturers of heavy duty wood pulleys and friction clutches in this country, having been manufacturing this line of equipment since 1873. At the Centennial Exposition in Philadelphia in 1876, they received the highest award for this class of goods.

Contractors who are not already supplied with these labor-saving devices should get in touch with the Erie Clutch & Pulley Company and be advised where they can save time, money, labor and reputation.

SCREEN TIME.

Fly time is screen time, and the screens should be put up in time to keep out the early visitors.

There are screens, and screens, that can be bought ready made, jerry made, well made and made to order.

The Standard Screen Co., 1848-50 W. 14th St., in their latest catalogue, "Door and Window Screens," show their stock sizes and the excellent construction of their goods. The wise contractor, builder and carpenter will do well to pay attention to the screen proposition, as it is a business which pays well, and frequently serves as a starter toward more important work for the owner.

WHEN YOU GET TO **SASH CORD** use **SILVER LAKE**

and insist upon getting it from your dealer. To insure you against substitution, we stamp our name upon every foot of our cord. Carried by all dealers.

SILVER LAKE BRAIDED SASH CORD was originated by us, and for forty years has been recognized as **THE STANDARD**

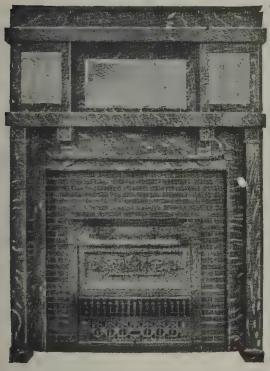
Established 1869

OAK FLOORING

Increases the Renting and Selling Values and Attracts a Better Class of Tenants

Builders and **owners** will find it a clinching argument to say, "It's floored with OAK FLOORING." It imparts an air of **refinement and elegance. It is the modern flooring.** OAK FLOORING ⅜ in. thickness by 1½ in. or 2 in. faces can be laid **over old floors** in old homes or over cheap sub-floors in new homes **at a very low cost.** It is **cheaper than carpets** or **pine flooring.** When laid it has all the appearance of heavy flooring.
There is a **solid satisfaction** and **lasting pleasure** in the **substantial** and **dignified appearance** of OAK FLOORING.
Contractors and carpenters find it very **profitable** to lay ⅜ in. stock over old floors in old homes during dull periods.
A little **canvassing** is all that is necessary to **secure jobs.** A carpenter or handy man can lay OAK FLOORING successfully.
For **durability** OAK is the best. OAK FLOORING laid **thirty years** ago, after very hard use, is still in good condition. ¶ **WRITE FOR CATALOG.**

THE OAK FLOORING BUREAU, 877 Hammond Building, Detroit, Mich.



QUARTERED OAK MISSION MANTEL

$42.00 Complete

With Coppered Art Glass, Beveled Mirror, Enameled Tile All Colors, and Grate.

Our 68 page catalogue shows complete line of more and less expensive mantels.
Sent free upon request.

Edw. F. Sonntag Mantel Co.
316 Sixth Street, Evansville, Ind.

KOLL'S PATENT **Lock Joint Columns**

Hot Off the Press

Our trade bulletin No. 1 containing valuable information for the Architect, Woodworker and Builder. All the information you need regarding wood columns. This is free for the asking.

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UNIVERSAL GARAGE EQUIPMENT.

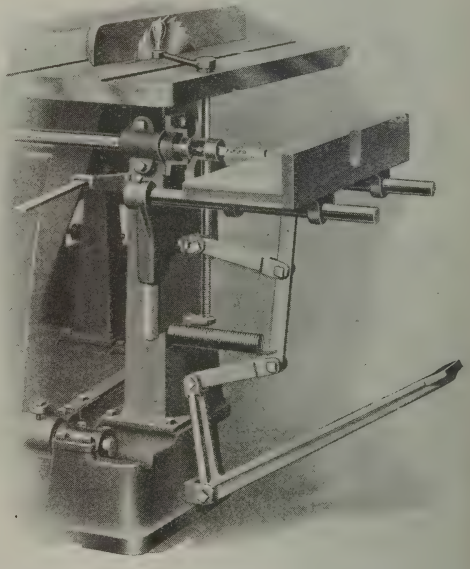
The use of automobiles is becoming so general that the special equipment for garages, etc., is becoming a subject which the average contractor should be posted upon.

The Canton Foundry & Machine Co., Canton, Ohio, manufacture garage accessories such as turn tables, jacks, trucks, cranes, etc., which are of great interest to anyone contemplating building or equipping garages.

A postal will bring their catalogues showing the many specialties which they manufacture for various classes of buildings.

BORING ATTACHMENTS.

The general use of portable and combination woodworkers has made it necessary that these machines should be fully equipped to do a variety of work. The owner of one of these outfits, as a rule, possesses comparatively little other machinery so that the more complete



the woodworker can be the better it is for him.

The Crescent Machine Company, Leetonia, Ohio, manufacture a machine known as the No. 51 Crescent Universal Woodworker. This is a very complete machine, doing practically all the work of a complete planing mill and includes rip, cross and band saws, jointer, shaper, sander, emery wheel, boring device, etc.

The boring device is very complete and arranged for performing the work accurately and speedily. The cut shown illustrates its operation as well as a much longer description would.

The Crescent Machine Company will be very glad to correspond with contractors or builders regarding shop equipment, portable woodworkers, mortising machines, etc.

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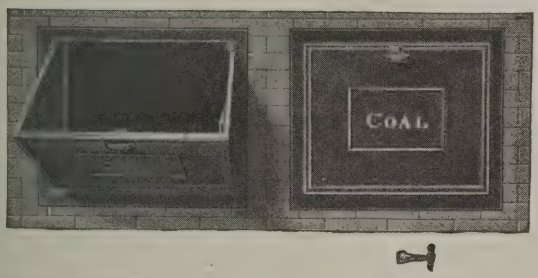

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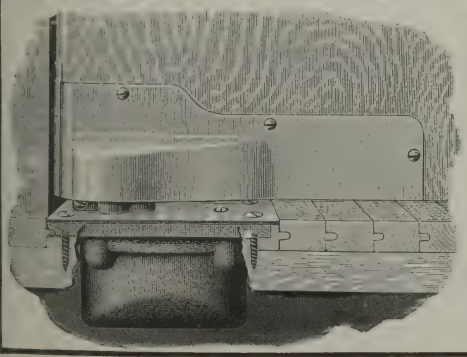

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A Checking hinge for double-acting doors between dining room to pantry or kitchen, etc.

It is a door check and hinge combined.
It automatically closes the door without a slam.
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It stops door exactly at center.
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It renders the action of door absolutely noiseless.
It will outwear three of the spring hinges now in common use.

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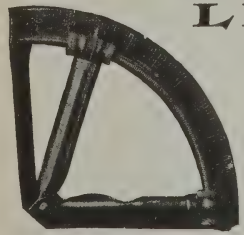

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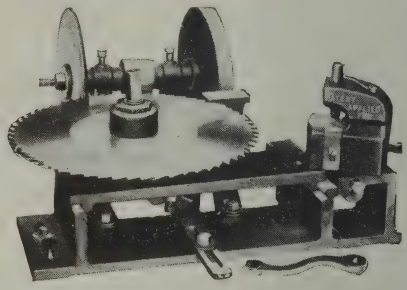
Saving space means saving rent and increases the value of a house at the same time. The Bessler Movable Stairway Company, Akron, Ohio, manufacture a stairway for use in places where space is limited. This stairway can be installed in an ordinary hall or room to provide access to an attic or upper floor. The cost of this stairway is very low compared with the benefit received from ready access to the upper floors. Its operation is so simple that it can readily be installed either in new or old buildings.

A line to the Bessler Company will bring full information regarding the installation and operation of these stairways. This information should be of interest to every contractor, builder and owner, as there are frequent calls for a stairway of this character.

A MACHINE FOR SHARPENING FACTORY SAWS.

Over on the west side of Chicago, a man who is operating a woodworking factory and has been for many years, not long ago got



tired of sending his saws to different places for sharpening, gumming, etc. Being a practical man in every way, he designed a machine which saved him the annoyance of sending his saws out to be fixed up.

This machine gums, joints, sets and sharpens a saw quicker and better than it can be done anywhere else or by any one else. His 12-inch machine will handle saws from 5 to 21 inches in diameter. The room required for the machine and emery stand is only 18x18 inches, and it can be fastened to the top of a work bench.

Mr. H. G. Conrad, 709 S. Clinton street, Chicago, Illinois, is the inventor and manufacturer of the machine, which is called the Conrad Saw Tool.

Very few contractors and builders or millmen care to waste time in sending their cross cut saws away for repairs. If they do this, they have to have an extra lot of saws on hand. Besides an inexperienced mechanic, with a Conrad Saw Tool, can gum, joint, set and sharpen the saws in fine shape and without any loss of time. The Conrad machine costs so little when compared to its usefulness and money saving ability for the operator that it can well be placed in every shop or mill where circular saws are used. Circulars are being mailed upon request.

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After a series of exhaustive service tests in various parts of the country, extending over a long period, we have pleasure in announcing that all of our **ROOFING TERNE PLATES,** including our well known MF brand, are now made exclusively from the best grade of

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We might tell you the many advantages of this metal, but so many roofing products without merit are being advertised that we desire to demonstrate the quality of ***our material*** in a ***more convincing*** manner by supplying a few ***full sized samples,*** free of charge. If you cannot procure these samples from your dealer, write to our nearest District Sales Office.

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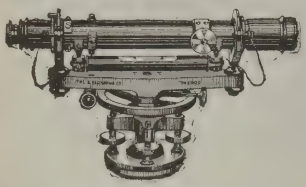

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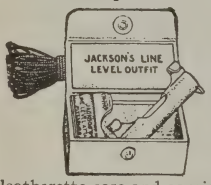

It takes the place of the old-fashioned sixteen-foot straight edge, yet it can be carried in your vest pocket. ¶No contractor, builder, carpenter, mason, bricklayer, architect or plasterer should be without one. ¶Just stretch your line and hang the level on it—it's positively accurate. ¶The complete outfit is put up in a neat leatherette case and consists of the level with a 40-ft. line, also a spring clamp for attaching the level to a steel square or pocket rule, thereby serving as a plumb rule or bench level. At your hardware dealer's or sent for $1 postpaid.

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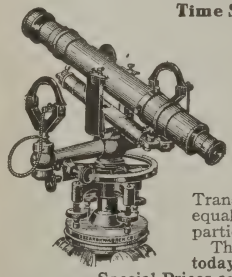

The Contractor who prides himself on the Accuracy of his work will tell you that the "STERLING" Transits and Levels are without an equal and will satisfy the most particular.

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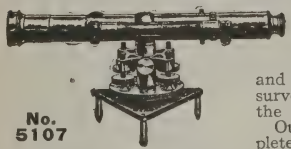

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METAL STORE FRONT CONSTRUCTION.

The Detroit Show Case Company, 481 Fort street, Detroit, Mich., are sending out their "Silent Salesmen" in the shape of a catalogue showing the Petz System of Metal Store Front Construction. The catalogue not only illustrates in detail the store front material made by this progressive firm, but it also shows a number of elevations of small up-to-date stores.

The carpenter and contractor should be on the look-out for remodeling jobs as by the use of such fronts as these, the contractor's reputation is greatly increased and the work leads to others of the same class.

With the assistance which the Detroit Show Case Company gives the contractor, there is no reason why even the small country stores should not present an imposing and pleasing appearance.

GETTING IN THE COAL.

No owner contemplates the erection of a house with any idea other than permanence. For this reason the parts receiving the hardest usage should be of the most durable character and installed in such a way that damage to them is a remote contingency. Possibly no part of the building comes in contact with harder service than the opening through which the coal is put into the basement. The material in itself is rough on even cast iron and particularly destructive to glass and wood. For this reason, the latter substances are practically barred from contact with it. Being used principally in the winter time subjects the coal chute to additional abuse and the class of drivers on the coal wagon are not used to handling their material with kid gloves.

The Holland Furnace Company, Holland, Mich., have carefully studied the situation in regard to getting in the supply of coal and have designed a chute to take the place of an ordinary basement window. In other words, the Window-Chute is a window when not in use as a coal chute and is automatically changed from one to the other. As the window chute is one of the first pieces of hardware to go into the building and as this is generally installed by the carpenter, every carpenter and contractor should be posted on the advantages of a window of this character. The Holland Furnace Company will be very glad to send their circulars and such additional information as is required.

It is interesting to know that the Holland Furnace Company also manufacture hot air furnaces which are giving unusual satisfaction. Their catalogue contains besides a description and prices of their materials, other information regarding the installation of hot air furnaces, which will be of value to both builder and owner.

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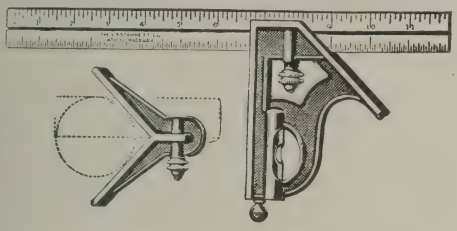
for Carpenters are made with just the same superiority in respect to accuracy, workmanship, design and finish as Starrett Tools for Machinists. And that's saying a good deal.



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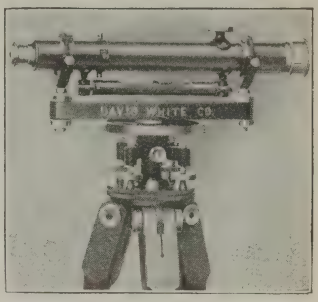

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WHITE'S LEVEL is the best for grading, building concrete sidewalks, laying out buildings, leveling, etc. Directions with each level. Examine it upon receipt and if found other than we represent it, return it to us and your money will be refunded.

Write for catalog and complete price list.

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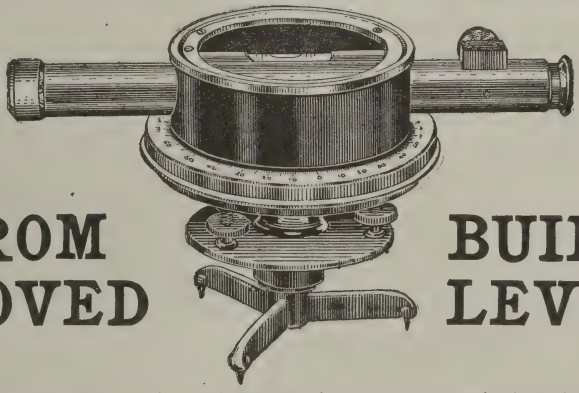

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whether he is now in the market or not, as the novel elements of construction entering into the **BOSTROM LEVEL** afford **means** for **proving** the **accuracy** of your work which we GUARANTEE is not surpassed in even the most expensive engineering instruments, and that feature when combined with their **simplicity** affords ease and quickness of adjustment and operation which marks the greatest improvement made in leveling instruments during the last quarter of a century.

That Bostrom's Levels fill a long felt want among all classes requiring the use of a dependable instrument, is best indicated by the demand already created throughout the continent which has resulted in our manufacturing in such quantities as to save the purchaser about **one-third** the cost of the old familiar type architect level, as the price of our No. 3 is only $25.00 and No. 4 only $30.00; either outfit, including tripod, graduated rod, target, plumb-bob, etc.— the only difference being in the magnifying power of the telescopes, No. 3 being 10 diameters, and No. 4 being 18 diameters. Prices named are F.O.B. New York, Atlanta, St. Louis, and all Pacific coast cities. Shipping weight 15 pounds.

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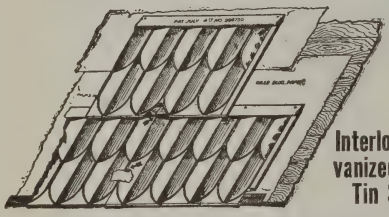

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The possession of this catalogue and a knowledge of our line and prices will save you many a dollar if you are an occasional or frequent buyer of Steel Ceilings.

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INDIANAPOLIS CORRUGATING CO.
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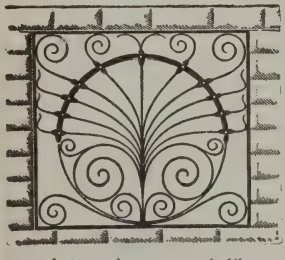

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we will send you catalog that is attractive enough to go in any man's library. Do you want it?

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THE FORD SINGLE LIP BIT.

The workman who quarrels with his tools is pretty apt to be a poor workman, although many times the tools themselves may be largely to blame.

Boring holes requires perhaps more skill than any of the ordinary carpenter occupations as there is no way except by the eye to judge the path the bit travels in. Should the tool be so made that it turns out of line at the least twist in the grain, the workman's troubles are doubled.

The Ford Single Lip Auger Bits are designed especially to produce the best results with the least effort. The manufacturers claim that no matter how hard the wood, the screw will not drift to one side with the grain or turn off against the hardest knots or cracks.

The carpenter who is not posted upon Ford Facts should write to the Ford Auger Bit Company, Holyoke, Mass., for information.

THE PROBLEM OF DAMP WALLS.

When a basement room must be decorated the walls require careful attention in order to prevent dampness ruining the surface.

One excellent way of preventing moisture in such places is by the use of Utility Wallboard. The photograph reproduced herewith

shows a church basement finished in this manner, in which the difficulty of damp walls was entirely eliminated.

Utility Wallboard, as made by the Heppes Company, 4502 Fillmore street, Chicago, Ill., is moisture-proof, being made of several layers of board and asphalt and formed in a special machine. Its nature permits its use over old plaster if desired or directly to the studding or joists, and the surface lends itself to practically any kind of decoration desired.

The Heppes Company have interesting literature which they are very glad to send to anyone considering the use of material of this character.

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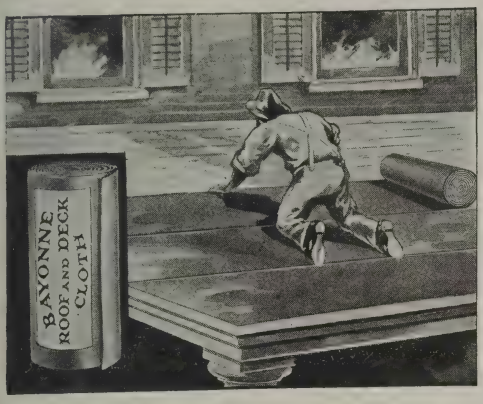

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Administration Building and Power House at Sault Ste. Marie Locks, Michigan. Asbestos "Century" Shingles specified by the U. S. Engineer Corps—applied by the Saginaw Sheet Metal Works. Illustration reproduced from an Artist's sketch.

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Asbestos "Century" Shingles

"The Roof that Outlives the Building"

The Engineers designed the Administration Building at Sault Ste. Marie Locks for their own occupancy. They specified the Asbestos "Century" Shingle roof.

Furthermore, these Shingles were submitted to the most searching test ever imposed on a roofing. They were plunged into cold water while red-hot.

The United States Government is one of the largest consumers of Asbestos "Century" Shingles in the world.

You can get Asbestos "Century" Shingles in shapes to suit any architectural style—in several sizes—and in three colors: Newport Gray (silver gray), Slate (blue black) and Indian Red.

Send for quotations and booklet "K. & M. 1912."

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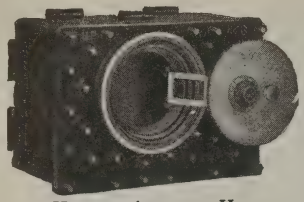

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It makes your Valuable Papers, Jewelry and Silver secure against Porch Climbers, Petty Thieves, Fire, etc.

No Home or Apartment House complete without one. It has a combination lock.

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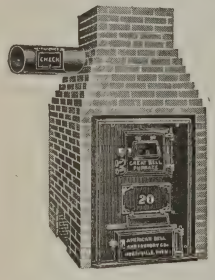

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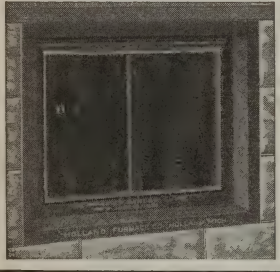

A Real Glass Window when closed, which is burglar proof

A Perfect Coal Chute
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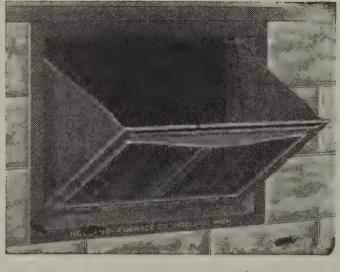
LOCKS FROM OUTSIDE AND CAN ONLY BE UNLOCKED FROM INSIDE



Write for Proposition to Contractors and Builders

HOLLAND CO., Holland, Mich.

STARRETT TOOLS.

Catalogue No. 19 of the L. S. Starrett Company, Athol, Mass., is a very complete catalogue of measuring tapes, steel rules, combination steel squares, calipers, micrometers, etc. The catalogue also contains a great deal of information regarding standard sizes of drills, wire gauges, threads, etc.

LUMBER ESTIMATING.

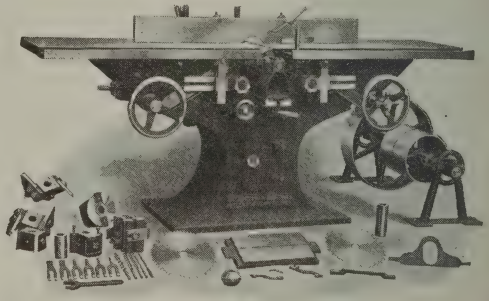
On account of the multiplicity of lumber sizes and dimensions, there is a great opportunity for an error in calculating the number of board feet in any given number of pieces. Any information which will eliminate any of the sources of error should be of great value to the estimator, builder and contractor. The saving effected in this manner may frequently amount to as much as the profit on the job.

Under the name of the Perry Lumber Reckoner, Mr. Benj. L. Jenks, publisher, 906 Williamson building, Cleveland, Ohio, has prepared a very complete schedule of lumber sizes and dimensions by which the estimator can immediately tell the exact number of board feet in any number of pieces. The book is very handily indexed in such a manner that it is possible to turn instantly to the desired size, thus reducing the work of calculating to a minimum.

Mr. Jenks will be pleased to send further information concerning this valuable book.

FINE WOODWORKING MACHINERY.

The catalogue of the No. 3½ Band Resaw, issued by the Cordesman-Rechtin Company, 10 Butler St., Cincinnati, Ohio, shows in very complete detail the construction and use of this machine. Besides the technical descriptions, the catalogue contains a great deal of valuable information regarding the operation,



No. 10 Standard Universal Wood Worker.

filing, stretching, etc., of band saws and other similar work.

The many years of experience of the Cordesman-Rechtin Company fits them for manufacturing a machine of this character, and every contractor wishing to make his shop complete should have this general catalogue as well as the catalogue of their No. 10 Standard Universal Woodworker, a cut of which is shown herewith.

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Why Practical Men Demand Amatite

ROOFING that needs paint every two years can't hold the market against Amatite—which *needs no paint whatever.*

Practical men know the great advantage of a roof that *needs no painting.* They know what a nuisance the painting is. They know how much it costs. They know how liable they are to neglect to paint their roofs at the proper time. Painted roofings are waterproof only where the paint is. AMATITE is waterproof all the way through.

AMATITE is sold in the usual convenient rolls of one hundred and ten square feet with a smooth lap where the mineral surface is omitted, so as to secure a tight joint. Nails and cement are packed in the center of each roll.

Free sample and booklet on request to nearest office.

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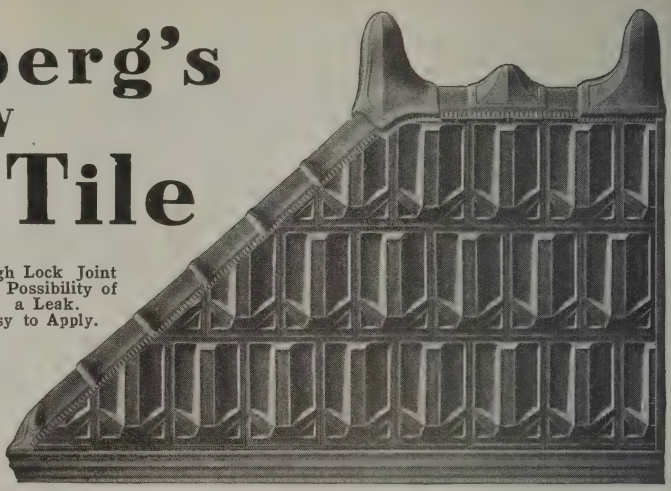
Kanneberg's NEW Metal Tile

High Lock Joint
No Possibility of a Leak.
Easy to Apply.



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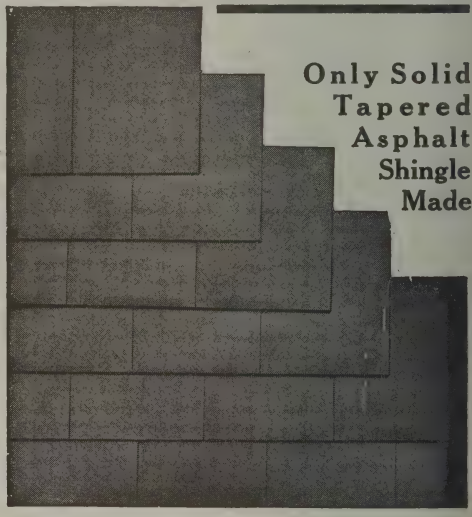
Here's a Shingle
To Make Your Heart Glad—
The Durability of Asphalt—
The Fine Appearance of Slate—
The Light Weight and Small
Cost of Wood



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are not made of ready roofing—The Asphalt is put where it is needed—on the exposed butt of the shingle—This feature is patented—No other maker can use it.

Colors are Red, Green and Natural Slate
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Their Strength Increases with Age and Exposure

Residence of Mrs. Clara F. Taylor, De Land, Fla.
Covered with J-M TRANSITE ASBESTOS SHINGLES

J-M Transite Asbestos Fire-proof Shingles, being made of pure Asbestos and Portland Cement (both minerals), are not affected by the most severe weather conditions, except that the longer they are exposed to the elements the harder and tougher they become.

J-M Transite Asbestos Fire-proof Shingles

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All sizes and shapes for all conditions. Colors: natural gray, Indian red and slate.

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U. S. GOVERN

(Dept. of Agriculture, F
issued June 30,

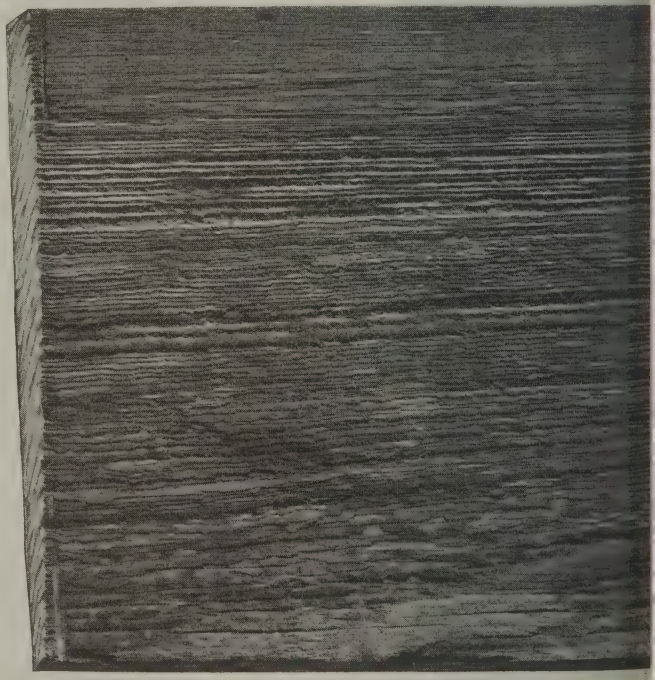
CYPR

"As Siding It Practically W

(FROM PAGE 44, U. S. GO

Same report says "CYPRESS" shows paint well and

(*You Know the Conservatism*



Here's a Photograph, (straight from the wood) of a piece of *Cypress Siding* taken from St. Charles College, La., duly attested in writing by the President, Father Maring. Built 1819—torn down 1910. *NOT A TRACE OF ROT.* Note that the lower or exposed edge, originally the thicker, has become the thinner by the simple erosion of nearly a century of rains.

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1911, says of

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ASK FOR VOL. THREE—ALSO FULL OF VITAL FACTS

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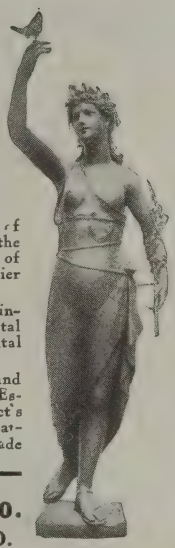

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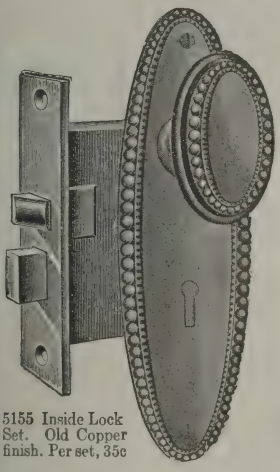

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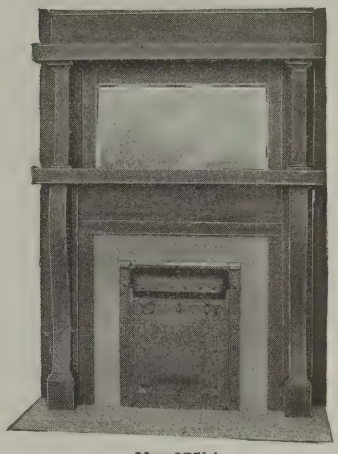

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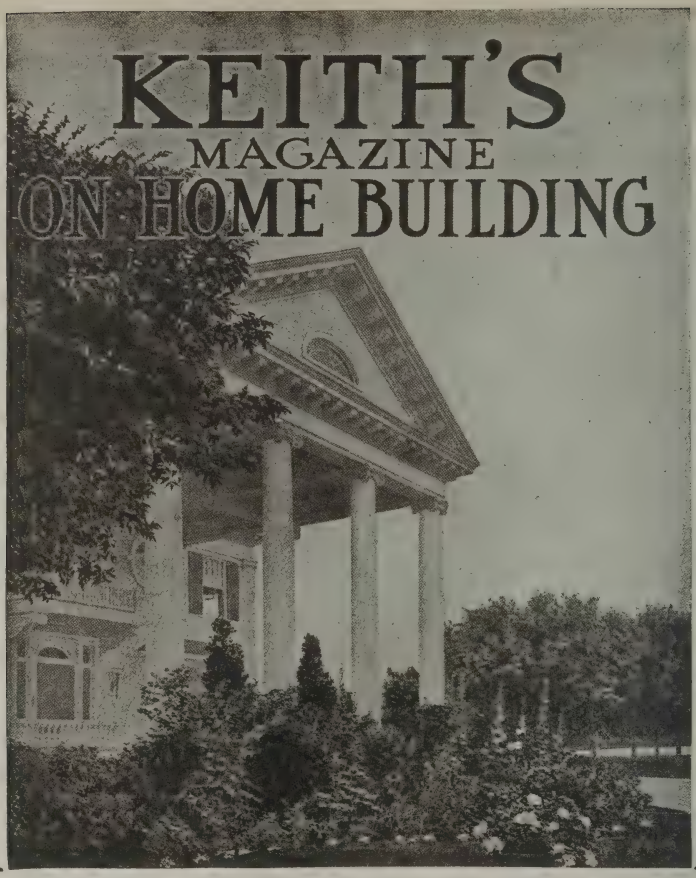

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The beam between Grille and Composition Cap is 4 inches high, set with embossed moulding and mitered on face. We call particular attention to the mitered parts as explained, as this is the most complete finishing on a colonnade arch grille.

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Instructions for Ordering

Give exact width of opening from jamb to jamb. Give exact height from floor to where top of cap will rest. Always give the width first then the height.

State what kind of wood is wanted, either Oak or Yellow Pine; also be particular and give design number.

Send order early. Do not wait until all other trim is set up in place.

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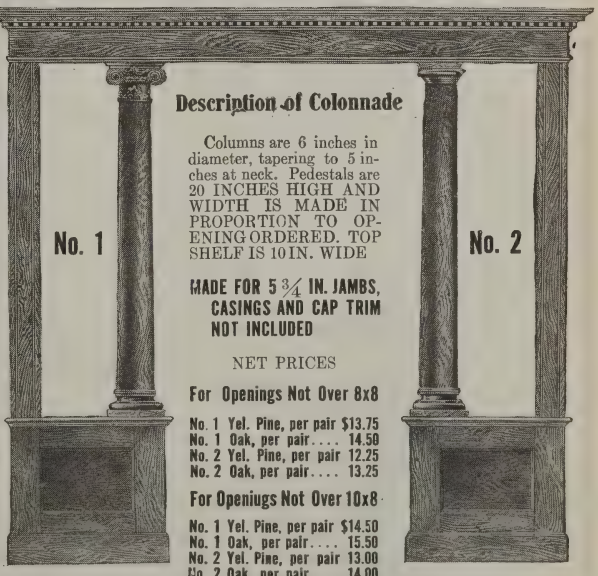

Description of Colonnade

Columns are 6 inches in diameter, tapering to 5 inches at neck. Pedestals are 20 INCHES HIGH AND WIDTH IS MADE IN PROPORTION TO OPENING ORDERED. TOP SHELF IS 10 IN. WIDE

MADE FOR 5 3/4 IN. JAMBS, CASINGS AND CAP TRIM NOT INCLUDED

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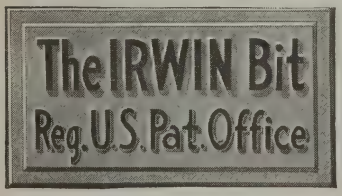

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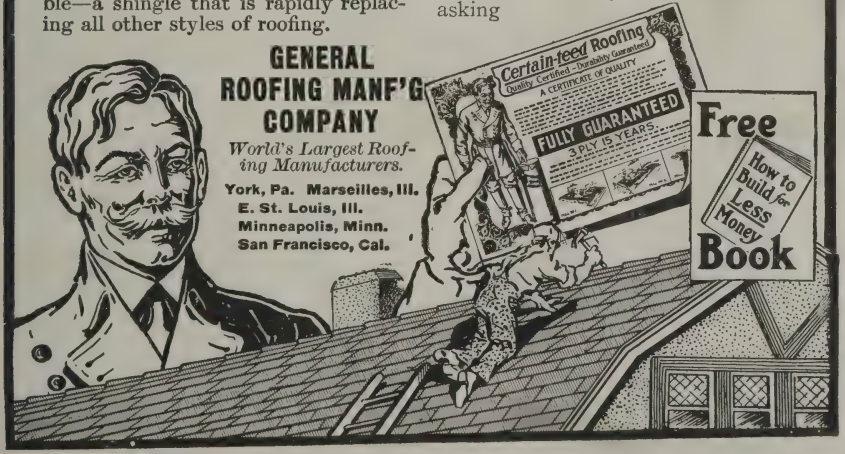

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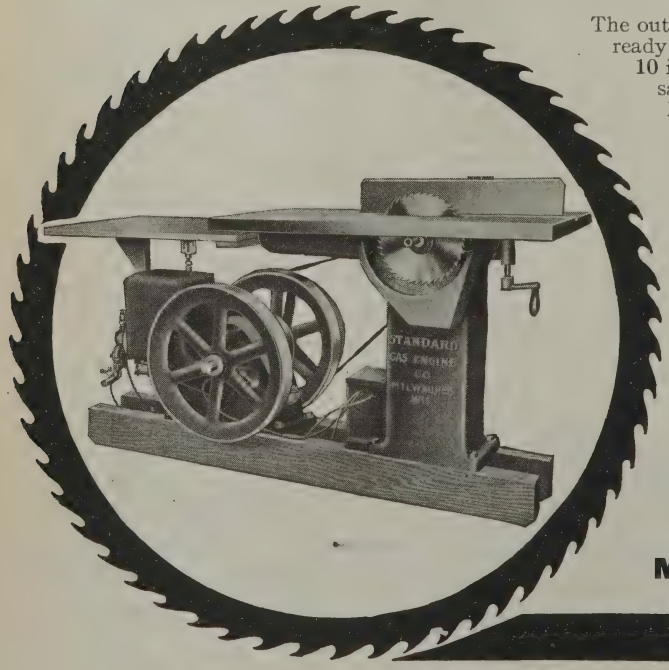
Carpenters, Contractors, Lumber Yards, Job Shops, etc., cannot afford to miss the extraordinary proposition offered on this portable wood working outfit, which is strictly up to the minute in every respect, in fact, it has many unusual advantages and the price will surely please you.

STANDARD SAW RIG

The gasoline portable saw rig is no longer an experiment, for it has demonstrated itself to be a practical necessity. The Standard Saw Rig is of rigid construction, perfectly balanced, and positively does not vibrate. It has heavy skids, iron pedestals and 4 H. P.—4 cycle hopper cooled engine, especially designed for the service. The saw rig may be easily removed, leaving a general purpose engine complete on skids.

Full Satisfaction or Money Back

(No Arguments)



The outfit is shipped entirely complete ready to run, with oiler, wrenches, 10 inch cross-cut saw, 10 inch rip-saw, ½ inch or ⅞ inch dado head, planer head with four knives and 6 inch emery wheel. Any other fixtures may be had at extra charges

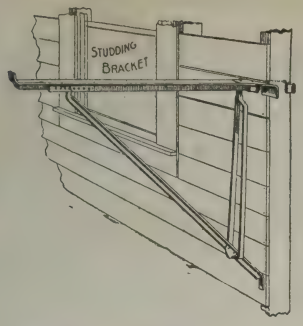
Cinch your share of this season's profits by ordering one of these outfits at once.

WRITE TODAY

STANDARD GAS ENGINE CO., Inc.

5th Floor Caswell Bldg.

MILWAUKEE, WIS.



THE "DETROIT" FOLDING SCAFFOLD BRACKET

COMBINES ALL GOOD FEATURES

SAFE: Owing to its peculiar construction, the load strain is entirely Downward with no tendency to pull outward from the building.

CONVENIENT: Its automatic and positive grip makes it possible to set up in 15 minutes without bolts, screws or nails.

ECONOMICAL: No builder can afford to be without it because its cost can be saved on a single contract.

MADE FOR EITHER STUDDING OR SHEATHING

FOLDING SCAFFOLD BRACKET CO.

50 Fort Street W. **Detroit, Mich.**

THIS BEAUTIFUL

COLONNADE

CAN BE USED AS

A MUSIC CABINET
A BOOK CASE OR
A CHINA CLOSET

It makes a combination that is useful, sensible and ornamental. In fact, it gives you four attractive pieces of fine woodwork or furniture for the price of one.

The measurements are: width, 26 inches; height, 42 inches; face, 11 inches. Veneered columns. Very compact and well made.

Let's get together. You will like our materials and prices. Write now.

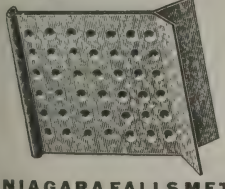
CHICAGO GRILLE WORKS

826-836 Wells Street

Chicago - - - Illinois

SPECIAL PRICES TO THE TRADE

NIAGARA GALVANIZED WALL PLUGS



For Building into Brick, Stone or Concrete Walls as a Base for Nailing

This Wall Plug can be put in place in one-tenth the time it takes to dig out mortar and drive in a wooden plug, and it is four-fold more secure. Will last as long as the building.

Write for Folder 57-B and sample.

NIAGARA FALLS METAL STAMPING WORKS

Manufacturers of Hardware Specialties

NIAGARA FALLS, N. Y., U. S. A.

Niagara Wall and Veneer Ties for use in brick and brick veneer walls, 12-inch Galvanized Wall Ties for stone, brick and concrete block walls, sash pulleys, sash chain, sash fixtures. 9M

WOULD YOU

Show this wholly visible Typewriter to your friends and let them see wherein **it excells any $100 Typewriter made,** if we would send one to you **Free of One Cent of Cost** for you to keep forever as **your own?** Then on a postal card, or in a letter to us, simply say: Mail particulars.

EMERSON TYPEWRITER CO., Box 64 Woodstock, Illinois.

The Recessed Steel Medicine Cabinet

MEDICINE
HESS SANITARY LOCKER
CABINET

The Only Modern, Sanitary, STEEL Medicine Cabinet

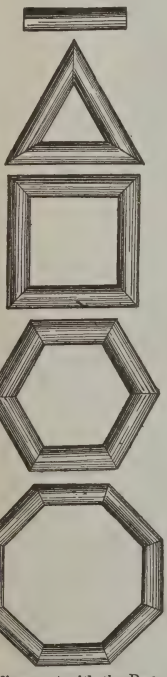
or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves. **Costs Less Than Wood.**

Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned. **Should Be in Every Bath Room.** Four styles—four sizes. To recess in wall or to hang outside. **Send for illustrated circular.**

HESS, 907 L Tacoma Bldg., CHICAGO

Makers of Steel Furnaces. *Free Booklet.*

The Outside Steel Cabinet



Mitres cut with the Red Devil by an amateur

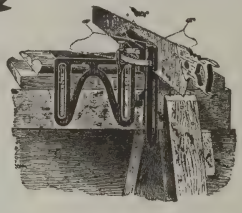
The Improved Red Devil Mitre Box

(Improved Feb. 1912)

What it will do with ANY Saw ANY Place.

SEE THESE MITRES? All absolutely perfect—cuts and accurate joints.

THE RED DEVIL MITRE BOX WILL CUT ANY ANGLE



It's all metal. It weighs 2 lbs.

There is no other just as good and you can easily prove it by accepting our

SPECIAL OFFER—On return of this "Ad" and $2.00 one of these Mitre Boxes will be shipped to any reader of "The National Builder." Offer good for 30 days from date of issue.

Smith & Hemenway Co.

Manufacturers

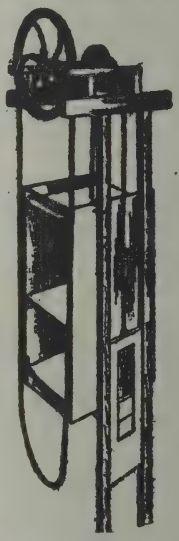
Chambers St., New York, U. S. A.

Red Devil Tools are the Best on Earth

THE EXCELSIOR DUMB WAITER

Sent Complete to a Nail $18.50

Knocked Down, Ready To Erect



Self Retaining Machine. Hardwood Car. Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one.

Send for Descriptive Pamphlet

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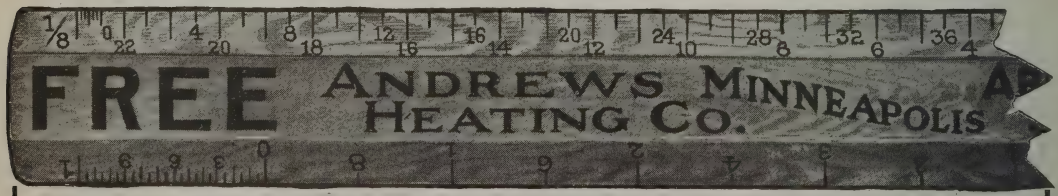


Architect's Scale SEND US TWO OR MORE NAMES of persons who are interested in or want to buy Hot Water Heating Plants and we will send you this scale. Back inches are divided into 6, 10, 12, 16, 20 and 40 parts. Also free catalog on request. Name this paper when writing.

ANDREWS HEATING CO., 1287 HEATING BUILDING MINNEAPOLIS, MINN.

Guaranteed Until 1927

Residence of William A. Munson, Oak Park, Ill.

I would take pleasure in recommending these shingles to any one who is desirous of securing a water-tight and durable as well as attractive roofing.

It required 19½ squares to cover my dwelling on which I figured a saving in labor as well as material of $4.25 per square over what it would have cost to have applied the best grade of wood shingles

Yours very truly,

William A. Munson

Roofed With Real Slate Surfaced Shingles Good for 15 Years of Solid Service

Permanent Colors Red or Gray

Proof Against Heat, Cold, Wind, Rain, Hail and Sparks of Fire

CARPENTERS—BUILDERS—ROOFERS

THERE'S MONEY IN THIS

You can increase your profits handling Oriental Slate Surfaced Shingles. They make a beautiful, enduring and substantial roof. When once introduced in any locality the orders will come in to you thick and fast without solicitation. ***We furnish these shingles for $4.35 a square.*** Unlike wood shingles there are no culls to be thrown away, every shingle being of uniform size, and they can be applied in about one-half the time it takes to lay the wood shingles. Consequently the cost of labor will be less. (Read Mr. Munson's statement above.)

These shingles are made from our regular rolls of Oriental Slate Surfaced Roofing which ***we sell at $2.25 a roll.*** (Retail price, $3.50 to $4.50.) It takes nearly three rolls of this roofing to make one square of the Slate Surfaced Shingles, yet we furnish them for less than the price of the two rolls. Upon application we will send you large samples of this splendid roofing in red and greenish gray colors. You will be surprised at the strength, weight and thickness. The beautiful appearance will be a revelation to you. We guarantee this roofing, whether purchased in regular rolls or in shingle shape, to wear for fifteen years, retaining its original color during all that time. Our guarantee means that we will replace the roofing free of charge if it does not last the full term specified. Write for the samples today and mention the "National Builder."

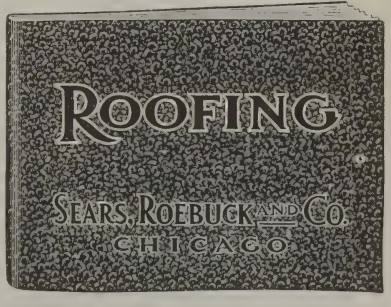
We Sell a Good Roofing for 50 Cents a Roll.

We handle everything in the roofing line. We can sell you a guaranteed roofing that will last twelve years for $1.70, a roofing that will last nine years for $1.45, a roofing that will last seven years for $1.20, and a roofing that will last five years for 95 cents a roll. We can sell you the so called "rubber roofing" for 75 cents a roll. This is the brand that usually sells for about $1.25. We furnish a Prepared Tarred Felt Roofing for as low as 50 cents a roll, and we guarantee it to be the best prepared tarred felt roofing made, regardless of price. Our illustrated Roofing Catalog shown to the right prices and describes our complete line. A postal card will bring it to you. Ask for Catalog No. 123NB.

This Catalog Lists Our Complete Line

It's Free

Send for It Today



SEARS, ROEBUCK AND CO., CHICAGO, ILLINOIS

Quitting Work

THIS looks like a dangerous way to quit work, but the man who must travel the streets of a city in going to and from his work is in more actual danger than this man because most accidents are caused by the carelessness of others. This man's safety depends upon himself, the chain and the engineer, but the safety of the man on the street depends upon a thousand and one circumstances over which he has no control. For every man the only sensible thing is an accident insurance policy protecting himself in case of injury and protecting his family in case of death. There are no other accident policies equal to those issued by the TRAVELERS.

MORAL: Insure in the TRAVELERS

The Travelers Insurance Company

HARTFORD, CONN.

Please send me particulars regarding ACCIDENT INSURANCE.

Occupation_____ Name_____

Age_____ Business Address_____

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Don't miss this Opportunity

We want One Carpenter or Builder in Every Community to Demonstrate, Take Orders for and Apply Our EDWARDS METAL SPANISH TILE ROOFING on a Liberal Commission.

Here is a chance to build up an independent, profitable business for yourself right at home. Many carpenters are devoting their entire time to selling our metal roofing. Others have made big profits devoting part of their time to selling and laying our Metal Spanish Tile.

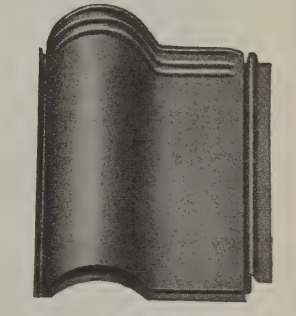
EDWARDS METAL SPANISH TILE

Is being advertised in the leading magazines and is now known to thousands of home builders and owners everywhere. Wherever it has been used it has made a decided "hit" because it shows off to good advantage on the roof and has numerous points of superiority over any other style of roofing.

Architects are specifying Edwards Metal Spanish Tile, for they know it will do away with roofing "troubles." Builders like it because of the finished appearance it gives any house on which it is used.

Our Metal Tile are stamped out of the highest quality Worcester terne plate in exact imitation of the most expensive Terra Cotta Spanish Tile. They come either "dip" painted or heavily galvanized, size 10x14 inches. Our patented interlocking side lock makes it possible to make a perfectly moisture-proof roof without soldering. Edwards Metal Spanish Tile afford the fireproof advantages of Terra Cotta Tile, but are much lighter in weight, cost but a trifle more than ordinary roofing and will last a lifetime.

WRITE US TODAY ABOUT YOUR TERRITORY. Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that someone else will be given your territory. DON'T DELAY. WRITE TODAY FOR OUR SPECIAL AGENTS' PROPOSITION.



Note the construction of patented interlocking device, protecting nail heads from weather and providing perfectly for expansion and contraction of the metal.

The Edwards Manufacturing Co.

"THE SHEET METAL FOLKS"

430-450 Eggleston Avenue CINCINNATI, OHIO

The World's Largest Metal Roofing, Metal Shingles and Metal Ceiling Manufacturers.

YES, YOU *CAN* GET IT!

You can get all you want of it! Just put a "MUST" on your order—and don't let anybody sell you any other lumber when you know that what you WANT is

"That's Good New

"WHITE PINE

There's *no way to make THIS Good News too strong* to suit the skilled and experienced *Carpenter* or *Contractor.* When he hears that (HE and YOU) CAN GET ALL THE WHITE PINE HE (or YOU) CAN WISH FOR — GET IT in any quantity—any place—any time—HE and YOU are Glad. (YOU KNOW VALUES.) You may have to do some INSISTING—and some *refusing of substitutes* — BUT WHITE PINE

is Worth All the Insisting that's Necessary.

NORTHERN PINE
MANUFACTURERS' ASSOCIATION

1118 Lumber Exchange, MINNEAPOLIS, MINN.

WHITE (or NORWAY) PINE!

s: Tell It Again!"

AND PLENTY OF IT"

The One Best Wood For Your TOOLS.
The One Best Wood For Your Customers.
The One Best Wood For Your Reputation.

When you know what you want—and what you want is good old WHITE PINE (or NORWAY) ("The Wood America is Mostly Built Of") DON'T TAKE ANY SUBSTITUTES

Write us today for "Why-When-WHITE PINE"—a really valuable 28-page illustrated **BOOKLET SENT FREE.**

New Wall Board Book in Colors

Scores of Ideas for Remodeling All Kinds of Buildings

Doesn't That Beat Lath and Plaster?

Our New Book in Colors shows you many ways of using Bishopric Wall Board in homes, apartments, offices, stores, factories, amusement park buildings, booths, schools, churches, libraries, etc. Send 6 cents in stamps for mailing.

Contractors and Builders! Send for our new Book of Home and Building Plans. It will give you ideas for use in every kind of building from an amusement park booth to the finest residence or business block. Far more durable than plaster—costs less.

The book shows Bishopric Wall Board walls in mission panel effects or decorated with paint, paper, textiles—every kind of finish.

Bishopric Wall Board makes everlasting walls. It is toughened asphalt, finished on one side with sized cardboard and stiffened on the other with kiln-dried laths imbedded under a pressure of 500 pounds to the square inch.

It is the only wall board made with laths. Laths are absolutely necessary in wall board to keep it flat, rigid and substantial. Bishopric Wall Board cannot crack, twist, swell, warp or pull away from studding.

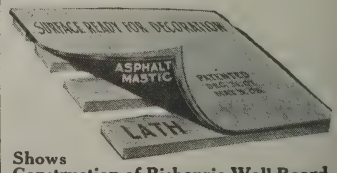
It comes in sheets 4x4 feet and one-eighth inch thick. Anybody who can drive nails can apply this Wall Board, and it is ready **at once** for decoration. No waiting for skilled labor. No waiting for setting or drying. **Saves a month in building.** Walls positively air-tight, moisture-proof, rat-proof, sound-proof and a non-conductor of heat or cold. Coolest rooms in summer, warmest in winter.

Save time, save money, and put the handsomest walls in new buildings by using Bishopric Wall Board.

Send 6 cents for mailing the book and see for yourself. Generous sample comes free with the book. Address

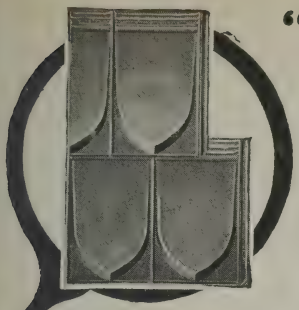
The Mastic Wall Board and Roofing Mfg. Co.
(See Our Advertisement on Page 3) 322 Este Ave., Cincinnati, Ohio

Applied Dry, Winter or Summer



Shows Construction of Bishopric Wall Board

BISHOPRIC WALL BOARD AND SHEATHING



"Finest Public School Building in the State"

Says Mr. Talley, the Architect, and he gives the credit to

CORTRIGHT METAL SHINGLES

Read for Yourself

CORTRIGHT METAL ROOFING CO., Jacksonville, Fla.

Gentlemen:—I enclose a photo of the Orlando Public School Building at Orlando, Fla. This is the finest public school building in this state and is covered with your Victoria Metal Shingles.

Yours truly, W. B. TALLEY.

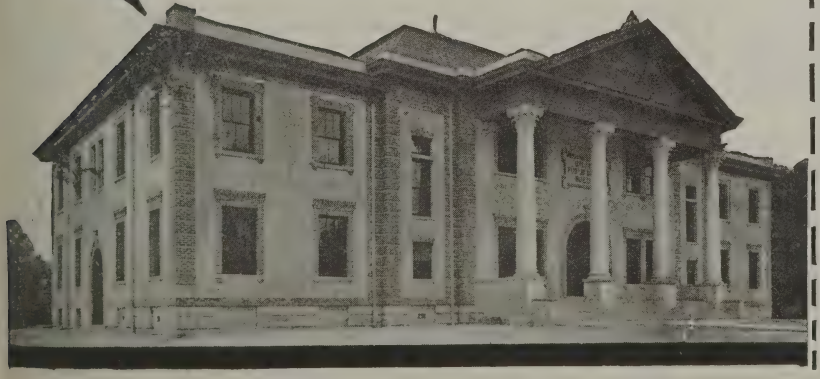
Now the point we want to make with you Contractors and Builders is this—

Architects are specifying them in ever increasing numbers. Owners of buildings want them because they meet every condition of service. Now, it will not only pay you to advocate their use, but they will solve the problem you have been up against in getting good wood shingles.

Send for Catalog and learn all particulars

CORTRIGHT METAL ROOFING CO.

Philadelphia and Chicago



COUPON

Gentlemen:

You may send me catalog. Adv.N.B.5-12

Name.....

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Address .....

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City .....

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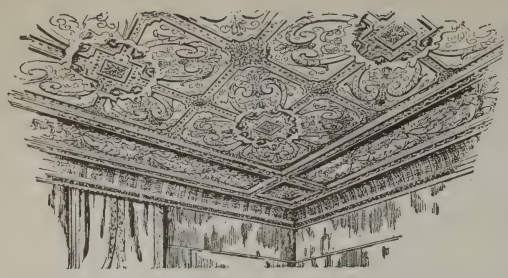
Business .....



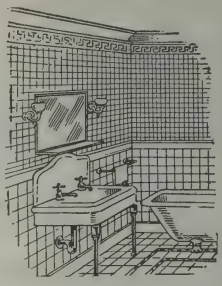
METAL TILING

For the Kitchen and Bathroom
Carpenters Can Apply It

METAL CEILING

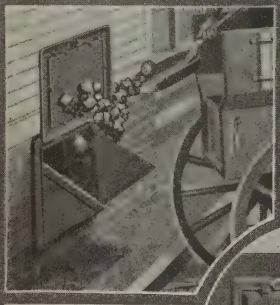
Something exceptional—out of the ordinary class—and as plain or elaborate as you like.

Patterns especially adapted for residence work. Nothing better for a new house, or to repair an old one. Catalog.

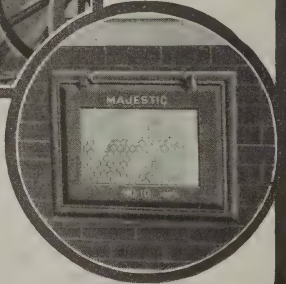


NORTHROP, COBURN & DODGE CO.
30 Cherry Street, NEW YORK

MAJESTIC
FOUNDATION
COAL CHUTE



¶ Protects the building just where most needed — above the opening
¶ The heavy steel hopper catches all the coal.



¶ When not in use, the hopper lies in the bottom of the chute body ¶ The door locks automatically either open or closed Strictly burglar-proof ¶ With ¼ inch wire glass or steel panel in door

Write for circular and address of nearest dealer.

MAJESTIC FURNACE CO
70-74 Erie St. Huntington, Indiana

SOMETHING NEW FOR YOU

—Metal Building Corners

Used with lap siding in place of corner boards. They save the price of the boards besides most of the work of finishing the corners. Give the popular mitre-corner effect without the slow, accurate work of cutting and fitting. Make a stronger and neater job.

WRITE FOR SAMPLES

F. D. KEES MFG. CO.
BEATRICE, NEBRASKA
BOX 811

KEES BEATRICE

Makers of Gossett Screen Hangers

365 Days' Trial

Our service department will co-operate with any Builder, Contractor or Architect who wishes to specify or install a dependable heating equipment. The

JAHANT Down-Draft FURNACE

solves the heating and ventilating problem for residences, schools, hotels, churches and similar structures. Our 365 day "Guaranty Bond" given with every furnace insures absolute satisfaction. Send us details, sketches or blue prints of the building to be erected, and we will furnish, without cost special plans, specifications and blue prints of a heating equipment guaranteed to furnish plenty of heat at a minimum cost for fuel. If you include the Jahant in your finished plans we will pay freight on the complete shipment, of furnace, pipes, registers, all fittings and the necessary tools. **Write for our free Specification Hand Book. It tells more about the Jahant and our co-operative plan.** Furnace Builders for over 30 years. **THE JAHANT HEATING CO., 90 Mills St., Akron, Ohio**

DOWN DRAFT

$10 DOWN $10 A MONTH

Will the Roofing Stay Waterproof?

The surface of any roofing may be made attractive, but to be sure the roofing will last you want to know what it's made of.

Genasco
THE TRINIDAD-LAKE-ASPHALT
Ready Roofing

is made of "Natures's everlasting waterproofer." This natural asphalt gives Genasco life and continued resistance. Genasco is lastingly waterproof through and through. Comes in rolls ready to lay. Ask your dealer for Genasco. Write us for samples and the Good Roof Guide Book—free.

The Kant-leak Kleet, for smooth surface roofings, prevents nail-leaks and waterproofs seams without cement.

GENASCO · THE STANDARD OF EXCELLENCE · TRADE MARK

THE BARBER ASPHALT PAVING COMPANY

Largest producers of asphalt, and largeset manufacturers of ready roofing in the world.

PHILADELPHIA

New York San Francisco Chicago

BUY FROM THE MAKER

¶ We have made and sold thousands of steel furnaces in Chicago, and we have sold them everywhere, by mail, direct to contractors, builders, and house owners, all over the country, from Maine to China. We don't offer them through dealers, for the DIRECT DEAL with the consumer is the most satisfactory to all concerned. It means BETTER SERVICE—because of the direct interest of the maker in each contract—and it means BETTER PRICES, for the middlemen's profits are cut out.

¶ In buying the Hess Furnace, **you needn't have faith.** You can buy it now, on trial, and test it before January 1st, 1913. We will deliver it at your station, with all pipes and registers—freight prepaid.

¶ Set it up and use it. If you're not pleased; not sure you have big value for the price—send it back to us—we paying return charges—and we won't claim one cent from you.

¶ We don't offer you credit, however, for we require the price to be deposited with your local banker when you receive the goods. He holds it till the test is made, subject to the conditions outlined above; and gives it to you or to us, according to the result of the test. You take no risk, and you will save money.

¶ Our furnace is made of steel, EVERY SEAM WELDED, and therefore permanently gas—dust—and smoke—tight. Made in six sizes, and burns any fuel. There is no furnace better, at any price.

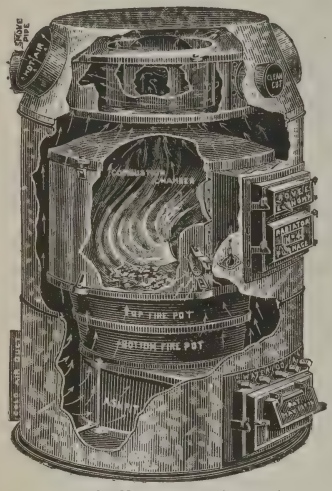
¶ Our 48 page booklet on furnace heating is free. Ask for one. It will give you a lot of useful information on heating.

HESS WARMING AND VENTILATING CO.

907 TACOMA BUILDING, CHICAGO

WE MAKE THOSE BEAUTIFUL WHITE STEEL MEDICINE CABINETS; CHEAPER THAN WOOD

Bovee Furnaces at Manufacturer's Prices



Bovee's Economy Furnace.

Saves 50 per cent of Cost; 40 per cent of Fuel. Most Durable, most Economical Furnace Sold. Has a perfect ventilating system for every part of building.

RESIDENCE HEATING PLANT

Hot air registers in five rooms, cold air return in two rooms, 40 in. Furnace, 20 in. Fire Pot, 28 in. Combustion Chamber, 10,000 cubic ft. Heating Capacity.

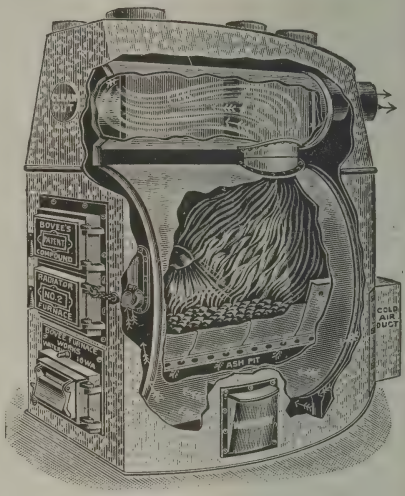
Special Price, $65.00

CHURCH AND SCHOOL HEATING PLANT

One large hot air, two cold air registers, 54 in. Furnace, 32 in. Fire Pot, 40 in. Combustion Chamber, 40,000 cubic ft. Heating Capacity.

Special Price, $95.00

Horizontal Furnaces with large doors or larger furnaces and more piping at proportionately low prices.



Bovee's Horizontal Furnace.

SEND FLOOR PLANS FOR FREE ESTIMATE

Bovee Grinder and Furnace Works, 60 8th Street, Waterloo, Ia.

"TITELOCK" METAL SHINGLES

TRADE MARK

Fire, Water and Lightning Proof

Finest in Appearance

Best of Material and Workmanship

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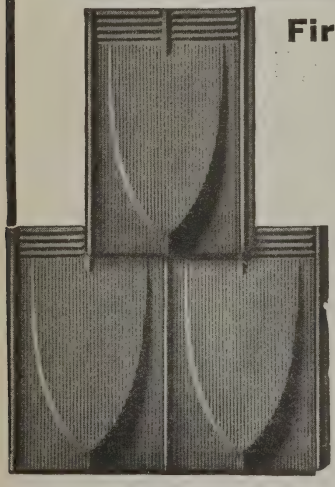

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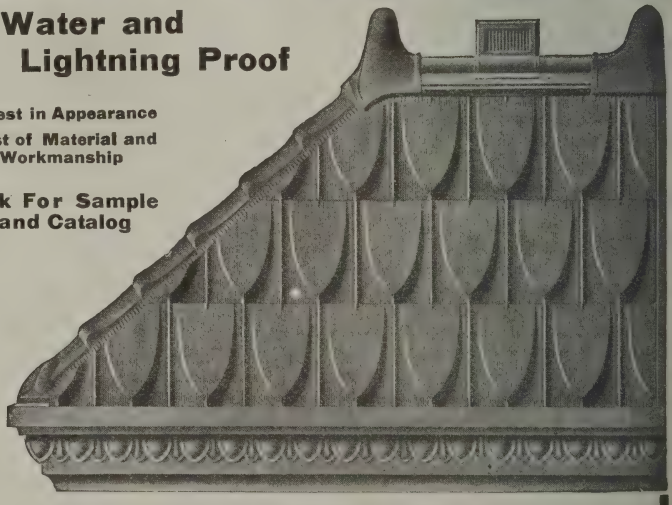


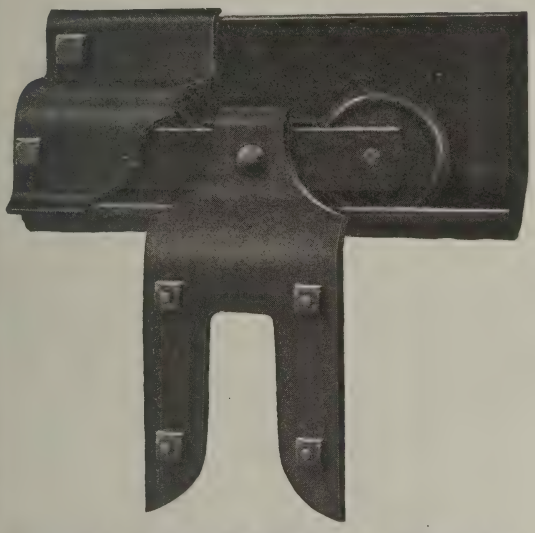
STYLE B. Showing Ridge and Hip Finish.

MILWAUKEE CORRUGATING CO.

Kansas City, Mo. Milwaukee, Wis.

WE INITIATE—NEVER IMITATE

Storm-Proof Hanger



Distinctive Features

Easy running.

Anti-Friction steel-roller bearings.

Frictionless contact with rail.

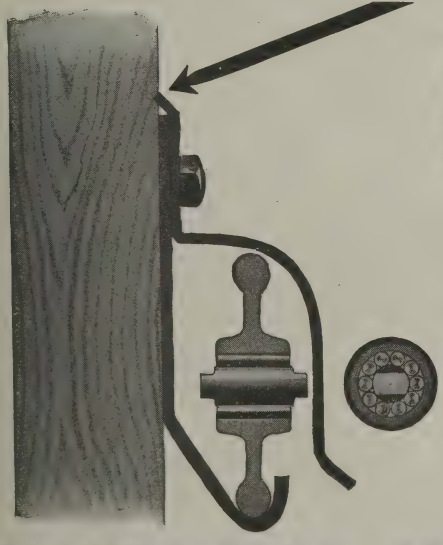
Great strength and durability.

Packed one pair in a box, with all necessary bolts for the hangers; also lag screws, cover-splice, and end-stops for rails.

Illustrated directions packed with each pair.

STORM-PROOF RAIL

TITE-FIT



Requires no brackets.

Forms a continuous bracket in itself.

Requires no housing. Fits close against the building. (See sectional view.)

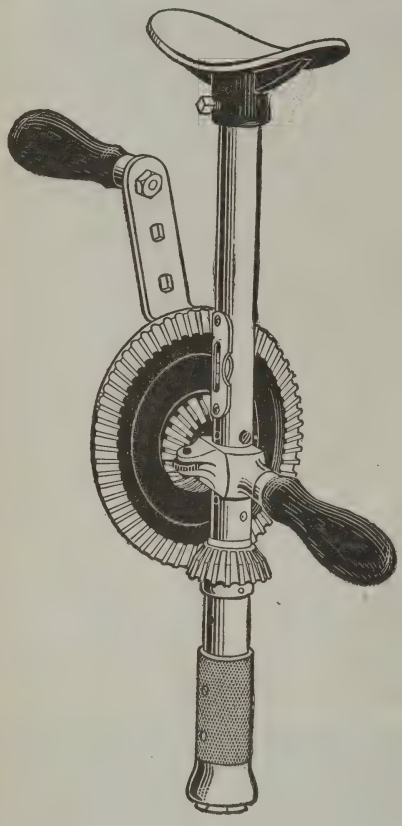
Perfect tread for hanger wheels. Bird- and Storm-proof.

A detailed description will be found in our general catalog, a copy of which will be gladly mailed on request.

NATIONAL MFG. COMPANY

STERLING, ILL.

Stanley Tools



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NEW BRITAIN, CONN. U.S.A.

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"The Sedgwick Machine Works,
130 Liberty St., New York.
Gentlemen:

In my house we had no elevator and my daughter had to depend on our man to carry her up and down stairs. If she wished to let the man have an evening off, she had to go upstairs right after supper and stay there. Now the man could be dismissed so far as carrying her in the house is concerned. She is entirely independent, goes up and down by herself, can run the elevator with one hand, and she goes up and down as often as she wishes and when she wants to. The elevator is a great comfort to us and we shall be glad to have anyone needing such a thing come and see it, or write us about it. There are many invalid ladies and men who toil laboriously upstairs who, if they knew of the Sedgwick Hand Power Elevators, would not be without one."

The above unsolicited letter was written to the Sedgwick Machine Works by a well known New England Judge who has had a Sedgwick Hand Power Invalid Elevator in his house now for nearly five years. The Sedgwick Machine Works, 130 Liberty Street, New York, will furnish his name and address upon request, or will send catalog and full information as to their Hand Power Elevators and Dumb Waiters free on request. Judge B—— purchased his elevator through his local carpenter.

Sedgwick Machine Works
130 Liberty St. : : New York

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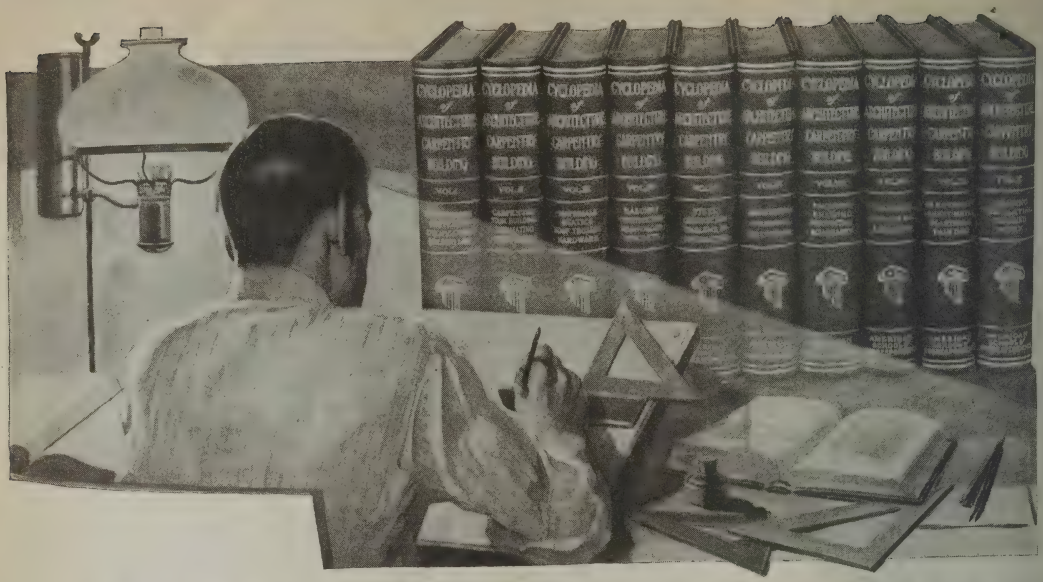

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Don't be satisfied with merely pushing a saw and driving nails. Learn to PLAN as well as to work—to use your BRAIN with the ***same skill*** that you use your hands.

Learn to fill a BIG-SALARIED job—the kind of a job that hundreds of other men, with no more natural ability than you, are filling with ease and success.

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TO BE REMEMBERED WHEN YOU ARE PURCHASING AUGER BITS

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THIS IS WHAT THE TURNED SHANK LOOKS LIKE IN THE CHUCK

This is important, for these bits are more easily and quickly placed in the brace chuck than any bits you ever saw, and after they're placed you don't have to worry about them — they will stay put.

The Precision Chuck for use with these bits, grips the long, true, turned shank and prevents wabbling or working loose. A turn on the sleeve is enough to "do the business."

The seconds saved each time you change bits makes many minutes when a day's work is counted up. Are YOU saving these seconds?

Ask your dealer for our new bulletin

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Manufacturing Co.
Chester, Conn.

21-81

Doesn't That Beat Lath and Plaster?

Best for Building—Better Walls

Big Time Saving—With Bishopric Wall Board

Contractors, Carpenters and Builders—make your buildings *distinguished* for their better walls by using Bishopric Wall Board in place of lath and plaster. It is the Twentieth Century Wall. Outlasts any building. Stays smooth, flat and rigid forever. Saves a month's time in building.

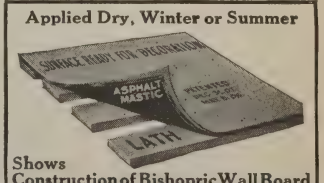
12,685,450 Square Feet of Bishopric Wall Board Sold in 12 Months

The demand is already on with a rush. Get your orders in now, and make sure of immediate deliveries.

This is the Wall Board made of Asphalt Mastic (toughened Asphalt). In one side strong, kiln-dried laths are imbedded. The other side (the *outside*) is surfaced with high-grade sized cardboard. Only Wall Board that stays flat, rigid and substantial for all time, because it is the only Wall Board in which laths are used. It cannot warp, swell, twist or crack. Air-tight, moisture-proof, vermin-proof, fire-resisting. Comes in sheets 4 x 4 feet, all ready to put on. Any man can apply it and it is ready at once for decoration. Used everywhere for walls of finest residences, cottages, bungalows, garages, resort buildings, amusement park buildings, etc. Ideal for remodeling houses. No dirt, no delay.

New Book Shows Scores of Uses

Send 6c to help pay for mailing fine new book in colors, showing many uses of Bishopric Wall Board. Complete set of Architect's Working Plans for model home comes with book. Generous sample of Wall Board Free.



Shows Construction of Bishopric Wall Board

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The Mastic Wall Board and Roofing Manfg. Co.
324 Este Avenue, CINCINNATI, OHIO (56)

BISHOPRIC WALL BOARD AND SHEATHING

O P P O S I T E

page applies to *you,* Mr. Carpenter, even stronger than it does your customer, because you understand so well how much it means *to be able to GET all the* **WHITE** (& Norway) **PINE** you want! Get the White Pine good news book.

Plain Lumber Facts. Drop a card today.

BOOK GOES RIGHT OUT

ONE OF THESE IS COMING YOUR WAY, TOO.

JUST PUT YOUR NAME ON A CARD TODAY—MENTION WHY YOU CARE—AND "WHY—WHEN—WHITE PINE"—FULL OF VITAL LUMBER FACTS—WILL GO TO YOUR ADDRESS AT ONCE. BUY YOUR LUMBER BY IT.

BUY NO LUMBER TILL YOUR COPY COMES!

WE WILL GLADLY GIVE PERSONAL COUNSEL—HELPFUL IN YOUR OWN CASE. Anyhow, WRITE US before you buy ANY lumber—for any purpose. DO IT TODAY. This matter of WHAT WOOD is best for the given case is much more important than many realize. Our reply will be PROMPT and CANDID—and the booklet is ready and will reach you by return mail. WRITE NOW.

NORTHERN PINE Manufacturers' Association

1118 Lumber Exchange **Minneapolis, Minnesota**

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The "ABC" of BEAVER BOARD Construction

The sixth of a series of twelve monthly talks to Carpenters about the practical use of *Beaver Board*, the *pure-wood-fibre* wall and ceiling material that is durable, economical, artistic; has none of the disadvantages of lath, plaster and wall-paper; and is appropriate to any type of building new or old.*

Beaver Board is essentially a proposition for Carpenters and Builders.

CHAPTER VI

Beaver Board is Specified by Architects

THIS, as you know, is a great help to the Carpenter, Builder and Contractor, especially to those who handle and sell Beaver Board, as well as look after the construction.

It is due to the genuine merit of Beaver Board and also to the fact that we are always actively engaged in explaining to Architects its many advantages and uses.

This advertising is directly in your interest and has been very successful.

Read This Letter: It's Typical.

L. A. H. KOETH, Architect
Room 2 Masonic Temple
Wilmington, N. C., March 1st, 1912.

THE BEAVER CO., Buffalo, N. Y.

Dear Sirs :—

Sometime ago your firm wrote me as to what I thought of your Beaver Board that I used on Mr. George Sloan's residence at Winter Park Gardens, Wilmington, N. C., and in reply I beg to say that I am more than pleased with same as it was used all over his house. This house has been built now going on two years and I have seen the walls several times since they have been finished and they improved with age.

I was in conversation with Mrs. Sloan only a few days ago and asked her if they found the house warm during the recent cold spell. She stated to me that the house was very comfortable. Now, Winter Park Gardens is a very cold place in the winter, as it is located in a place that is open where the winds can come from all directions.

I will take great pleasure in recommending your board to all of my clients that desire something that is not only beautiful but practical and am now figuring with several parties that will use it in several fine residences that will be built this spring.

If this letter will do you any good, why use same with my compliments.

Yours very truly,

(Signed) *L. A. H. KOETH.*

*These chapters began in the January number. If you missed the back numbers, write us and we'll mail them.

Mr. Sloan, Wilmington, N. C., chose Beaver Board for his walls and ceilings. He is not only delighted with their artistic beauty, but finds that they have freed him from lath-and-plaster troubles.

This view of a bed-room in Mr. Sloan's house shows how Beaver Board design can be varied to suit requirements. It is very different from the living-room, yet equally attractive.

Hunt up the nearest Beaver Board dealer and get an early chance to try your hand. And meantime write us for the early chapters in this story as well as our free booklet, "Beaver Board and Its Uses."

Think How Much is Being Done to Get Beaver Board Work For You

1. A big, national advertising campaign, every year, reaching owners of every kind of building, besides architects and contractors.
2. Local advertising by our agents and distributors, locating good prospects.
3. Co-operation by our Architectural Department; placing jobs for you, making estimates, interesting owners, giving you any kind of help in our power to ensure the satisfactory results that produce letters like Mr. Koeth's.
4. Recommendations cheerfully given by Beaver Board distributors to men who show they can put up Beaver Board and get uniformly satisfactory results.

BEAVER BOARD

PURE-WOOD-FIBRE

WALLS & CEILINGS

BEAVER BOARD

PURE WOOD FIBRE

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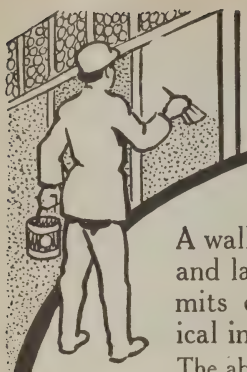


Wall Board Painted with DULLKOTE

A wall board interior, painted with Dull Kote, is sanitary, artistic and lasting, and can be washed with a sponge like tile. It permits of tasteful decorative effects, is easily applied and economical in use.

The above are only a few of the many reasons why it is the ideal wall covering for

RESIDENCES, SCHOOLS, CHURCHES, STORES, PUBLIC BUILDINGS

But be sure it's Dull Koted.

Johnston's Dull Kote Paint contains no white lead or anything injurious. It will not rub, flake or peel off, dries hard with a washable surface, free from brush marks or laps.

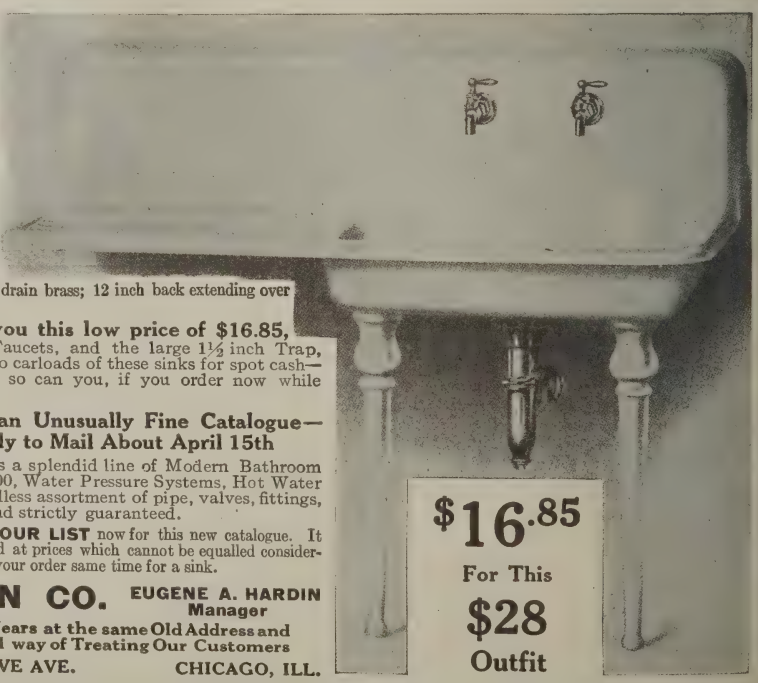
We will send any Architect, Carpenter or Owner our free color folder and valuable suggestions for interior decoration. Send your name in today.

The R. F. Johnston Paint Co.
Pearl & Main Sts., Cincinnati, Ohio

This is the Best "BUY" in Long Back One Piece Sinks you can find anywhere

Read the Description IT'S TRUE

This is a new designed Porcelain Enameled Roll Rimmed Sink, having Back and Drain Board all in one piece—Wall Hanger, Adjustable Legs, Concealed Galvanized Air Chambers, Nickel-plated Strainer, Fuller Adjustable Flanged Bibbs and "P" Trap, with waste to wall. Sink is 20 by 30 inches with 20 by 24 inch counter, sink drain brass; 12 inch back extending over sink, and runboard all in one piece.



We are able to make you this low price of $16.85, which includes two $1.50 Faucets, and the large 1½ inch Trap, simply because we bought two carloads of these sinks for spot cash—got them at a bargain—and so can you, if you order now while they last.

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For This
$28
Outfit

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Doing Business for 25 Years at the same Old Address and in the Same Square Old way of Treating Our Customers

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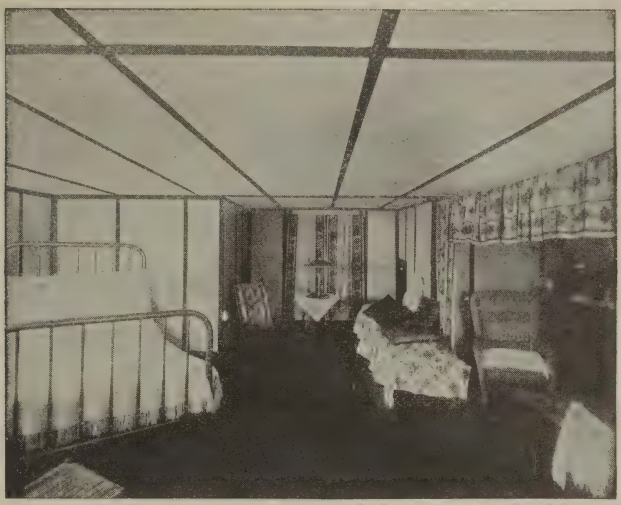

Did you ever see a piece of Utility Wall Board?
Why don't you write for a sample?

If it is as superior as we say it is, you can't afford not to know about it.

If it will make a better and smoother wall and ceiling—if it is more durable, easier to apply and less expensive—you ought to have that sample and you ought to have it *at once.*

UTILITY WALL BOARD

is different from any other wall board you ever saw. It is tougher, more durable—it is made in a greater variety of sizes—it is absolutely moisture proof—*and it will not warp or shrink.*

Utility Wall Board is a tough fibre board put together with two insulations of natural waterproof asphalt—all rolled under tremendous pressure into one solid, compact sheet and surfaced on both sides with special moisture proofing. It is the only Wall Board made under this scientific moisture proof process.

Utility Wall Board takes the place of lath and plaster. It comes in 32 and 48 inch widths and any length up to 16 feet.

It is attached direct to the studding without any of the muss and dirt and tedious delays of a plastering job.

It makes a very handsome wall without any decoration at all—or it may be tinted, paneled or papered in any style desired.

But about that sample—send your name today and you'll get it.

THE HEPPES COMPANY, 4502 Fillmore Street **Chicago, Ill.**

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"The TRAIL of the KORELOC
TREE TO FINISHED PRODUCT

THIS GUARANTEES SELECTED MATERI
WORKMANSHIP and the LOWEST PRIC

KORELOCK

More than Two-Thirds of th
Reach the user through th

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We invite correspondence from Contract
We respectfully remind you that the o
promptly *is to apply for same* ***at onc***

We Manufacture Everything Know

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"ORIGINATORS OF THE STANDAR

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KORELOCK

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PAINE Korelock Doors"

DOOR" leads straight "FROM
without leaving PAINE Ownership.

DETAILED INSPECTION, SCRUPULOUS
consistent with QUALITY and OUR GUARANTEE.

World's Standard Veneered Doors
PAINE PLANT Shown Below.

nd Builders anywhere in the world.
ay to secure our New CATALOG "C"
Requests met in order received).

KORELOCK

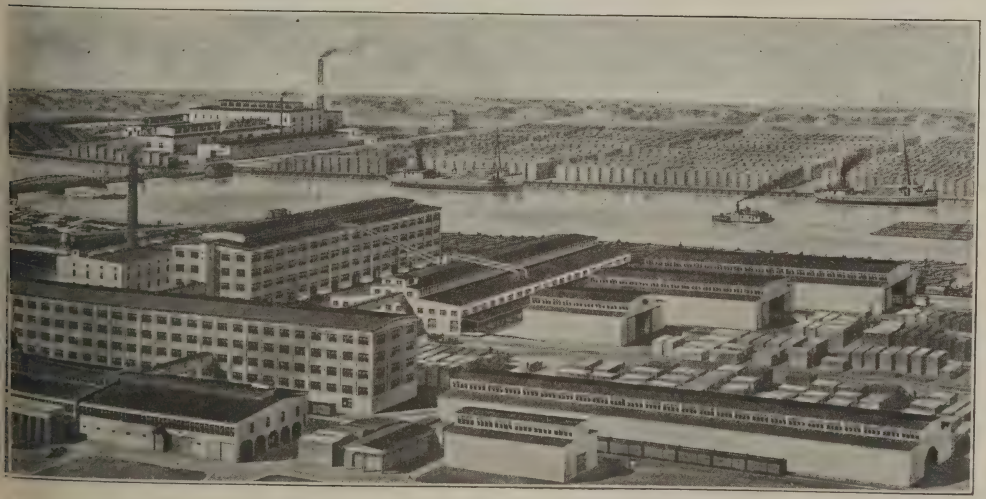
in Millwork—in Every Kind of Wood

LUMBER CO., LTD.

HARDWOOD VENEERED DOOR."

ONSIN, U. S. A.

KLIMAX



KLIMAX

PAINE

KORELOCK

PAINE

THE REAL SE

This is the very latest and newest triumph in a combination portable woodworker. It is the result of years of study, of actual test, and of engineering skill. This No. 3 Rig does MARVELOUS work and is a complete planing mill with no line shafts or large amount of floor space.

IT WILL RIP 2 INCH LUMBER WITH EASE, CROSS CUT FROM SQUARE TO MITER IN EITHER DIRECTION, SIZE, JOINT FOUR INCH LUMBER, PLANE, PLOW AND BORE WINDOW FRAMES, CUT MOULDINGS, DO SHAPING, JIG-SAWING, RABBETING, MITERING, MORTISING, TENONING, SANDING, AND TOOLS CAN BE SHARPENED ON THE EMERY WHEEL.

4 HORSE POWER FOUR CYCLE WATER HOPPER COOLED C. H. & E. GASOLINE ENGINE

The engine is high class and of our own manufacture. It is regulated to run four hundred fifty revolutions per minute, a speed which gives a full rated power of four horse, and will not run the engine to pieces. It is simple and easy to start and it is made of the best material and workmanship.

THE FRAME CONSTRUCTION of saw rig is of angle iron, legs and maple girders securely bolted, making a light and extremely rigid frame. This frame is bolted to a strong 4 in. by 4 in. yellow pine skid with wheels mounted on one end so as to make it more portable.

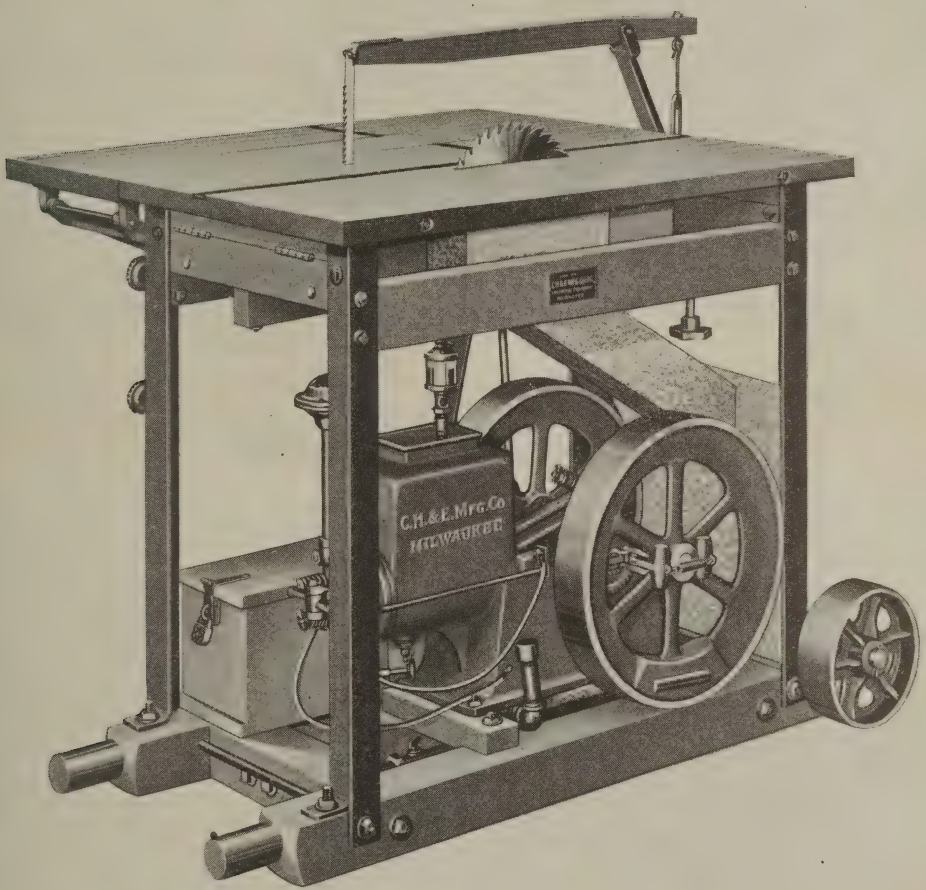
WRITE FOR OUR ATTRACTIVE FOLDER OF THIS, OUR No. 3 SAW RIG. . . . .

C. H. & E. MANUFACTURING CO. INC.

319 MINERAL STREET - - - MILWAUKEE, WIS.

NSATION OF 1912

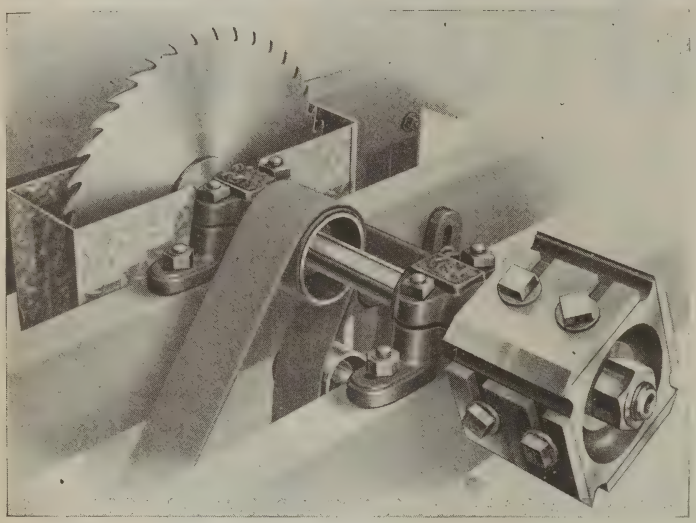
SEE PAGES 14 AND 15



ATTACHMENTS

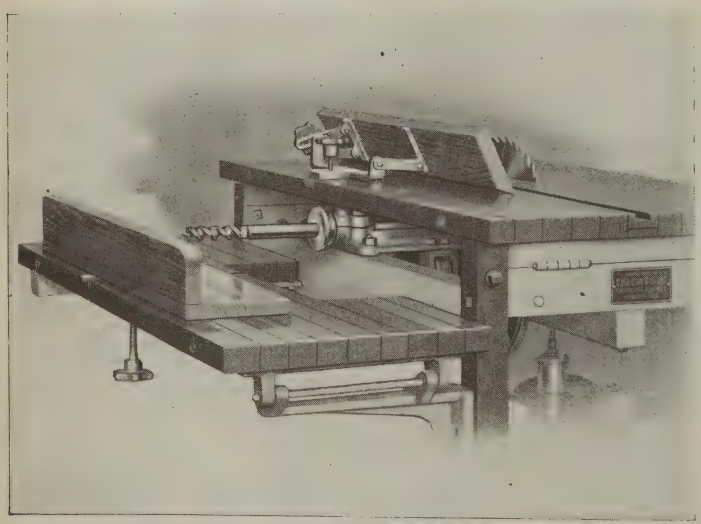
One 12″ Rip Saw,
One 12″ Cross Cut Saw,
One 8″ dia. ½″ Dado Head,
Four inch Jointer Head,
Jig Saw (3 Blades),
Boring Table (3 Bits),
Emery Wheel,
10″ Sander,
Adjustable Gauges,
Canvas Cover,
Trucks,
Huther Bros. Adjustable Dado Head

FOUR INCH JOINTER



THE JOINTER attachment operates on the same mandrel that the saw is secured to; in other words, the circular saw is at the left end of mandrel (in center of table) and the jointer, as well as the dado head, moulding knives, sander, emery wheel, etc., is at the right end of the mandrel. No saw block is fitted around the saw. The saw slot is cut directly through the main wood table. The Jointer Head is of very heavy construction, four inches wide, with four knives strongly bolted to the head. An adjustable iron plate sets in the drop table and can be so adjusted as to give any desired cut. This jointer can be used to great advantage in connection with the rip saw, as both operate at the same time without interfering with each other, thus enabling the operator to joint and straighten material and also to size and joint the outer edge, completing the work. The Jointer has an adjustable gauge which makes it possible to cut at any angle up to 45 degrees.

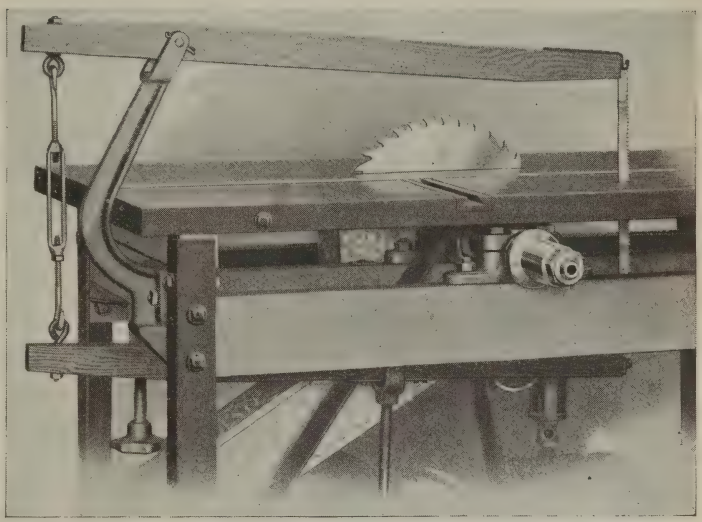
BORING TABLE



THE boring table consists of a sliding carriage working upon the adjustable side table which supports the material to be bored. This side table with boring carriage installed can be set at any desired position and holes may be bored with accuracy. This attachment is useful in making window jambs and in mortising. The bits used are the regular standard size, which can be purchased at any hardware store. One each $\frac{3}{8}$", $\frac{1}{2}$" and $\frac{3}{4}$" bits are furnished with this attachment.

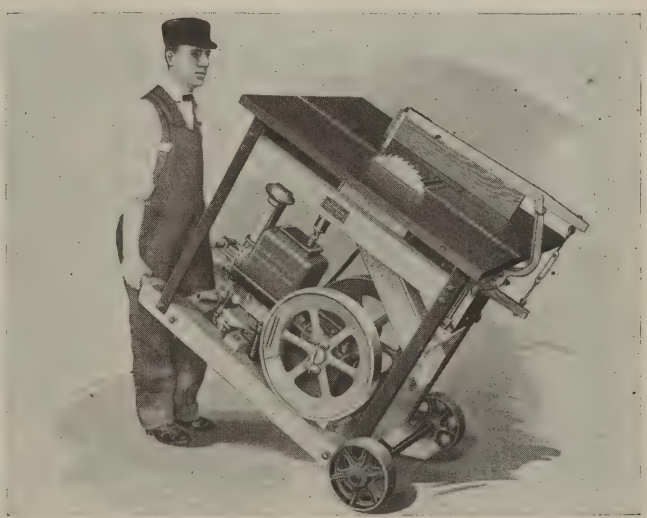
C. H. & E. MANUFACTURING CO., Inc. 319 Mineral St., MILWAUKEE, WIS.

JIG SAW



THE JIG SAW is one of the big features of the C. H. & E. No. 3 Saw Rig. All work that can be performed by a band saw can be done with this attachment. It is easy to install, requiring only the screwing up of two bolts which fasten the iron jig frame to the saw table. The arms are 32 inches long, and are made of clear maple, fitted with a turnbuckle to adjust the saw. All the bearing joints are fitted with brass bushings. The power for the saw is run off of the crank shaft of the engine. An eccentric is attached to the crank shaft which gives the necessary stroke to the arm running the saw. It will cut lumber up to five inches in thickness, such as rough cornice brackets, stair and step strings, veranda railings, etc. All your cabinet work can be done with this attachment. Three jig saw blades, narrow, medium and wide, are furnished with this tool.

TRUCK



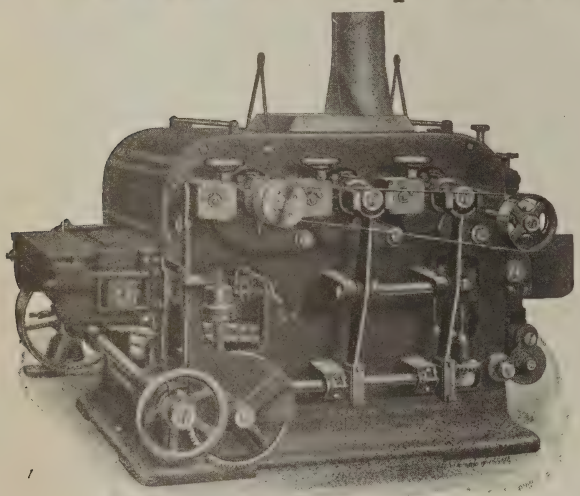
THE skid is built of 4″x4″ yellow pine, 4′ 6″ long x 21″ wide, strongly bolted with tie rods. A set of cast iron wheels 9″ diameter, 3″ face, is mounted on one end so that the entire saw rig can be wheeled by raising one end. The skid however sets firmly on its base when in operating position, the wheels being off the ground. Can be wheeled through any ordinary sized doorway. Total width of rig, 30″, with side table removed. Total weight of outfit, 697 pounds.

C. H. & E. MANUFACTURING CO., Inc. 319 Mineral St., MILWAUKEE, WIS.

Established 1847 SMITH OF SMITHVILLE Incorporated 1878

Woodworking Machinery

The New Sander



will do 200 to 600 per cent more and better work than possible on ordinary sanders.

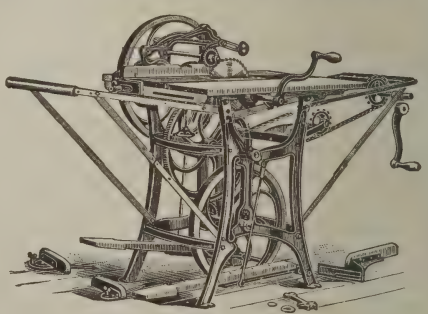
Send for late Literature relating to Sanders and other Woodworking Machines.

H. B. Smith Machine Co.
Smithville, N. J., U. S. A.
New York Chicago Atlanta San Francisco

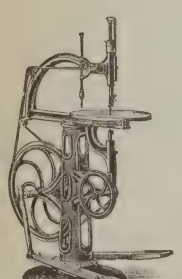
FOOT, HAND AND LIGHT POWER

Wood-Working Machines

Carpenters, Builders, Cabinet-Makers and other wood-workers can successfully compete with large shops by using our labor saving machinery. Save for yourself some of the profits you have been paying to the mills. With our machines one man will do as much work as four to six men using hand tools; will do it easier; will do it better.



No. 5 "Union" Self Feed Rip and Cross-Cut Saw



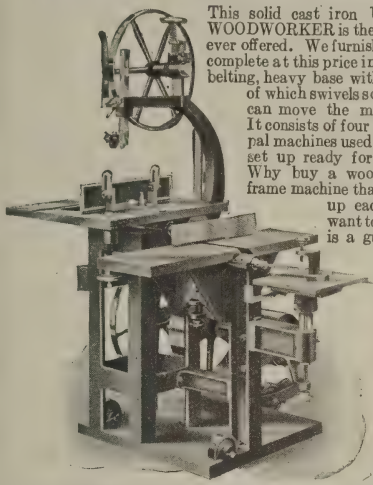
"Victor" Scroll Saw

"Diamond" Mortiser

Send for catalog "A" describing our complete line

THE SENECA FALLS MFG. CO.
629 Water Street SENECA FALLS, N. Y., U. S. A.
(249)

$125.00 Buys Four Machines — A Band Saw, A Saw Bench, An 8" Jointer & Planer, A Mortiser and Borer



This solid cast iron UNIVERSAL WOODWORKER is the biggest value ever offered. We furnish the machine complete at this price including tools, belting, heavy base with wheels, one of which swivels so that a man can move the machine easily. It consists of four of the principal machines used in a mill, all set up ready for instant use. Why buy a wooden or angle frame machine that must be set up each time you want to use it? Here is a guaranteed superior machine for one-third to one-half the price others ask. It is a better value in every way. We guarantee it absolutely and will refund your money if you are not perfectly satisfied. You should see our illustrated literature on this wonderful proposition before you buy a WOODWORKER.

Write To-day.

THE TANNEWITZ WORKS
317 NORTH FRONT STREET
GRAND RAPIDS - - MICHIGAN

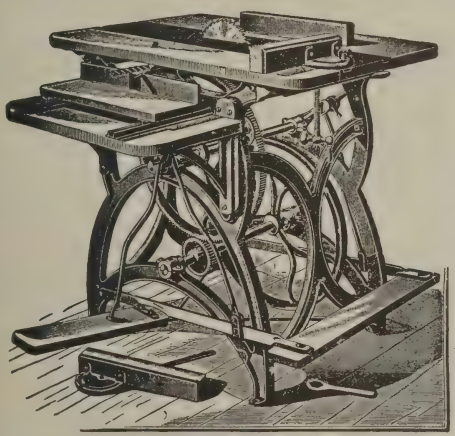
One of Our Specials

27 inch Complete ⅜ Band Saw
Wright Roller Guide
Weight 800 lbs.
$55.00

32 inch Complete ⅜ Band Saw
Wright Roller Guide
Weight 1100 lbs.
$75.00

Prices F. O. B. Factory. Also a complete line of wood working machinery.
Write us about our special offers.

United Machinery Co.
88-89 Centre St. New York, N.Y.



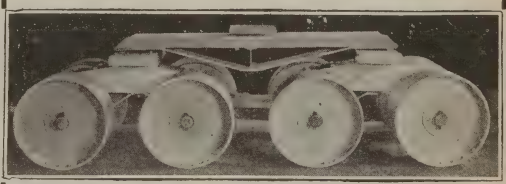
MARSTON'S
Hand and Foot Power Circular Saw

Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

Send for Catalog

J. M. MARSTON & CO. 193 Ruggles Street BOSTON, - MASS.

Move the Old House to Another Lot
Instead of Wrecking It
You Can Make More Money by Doing So



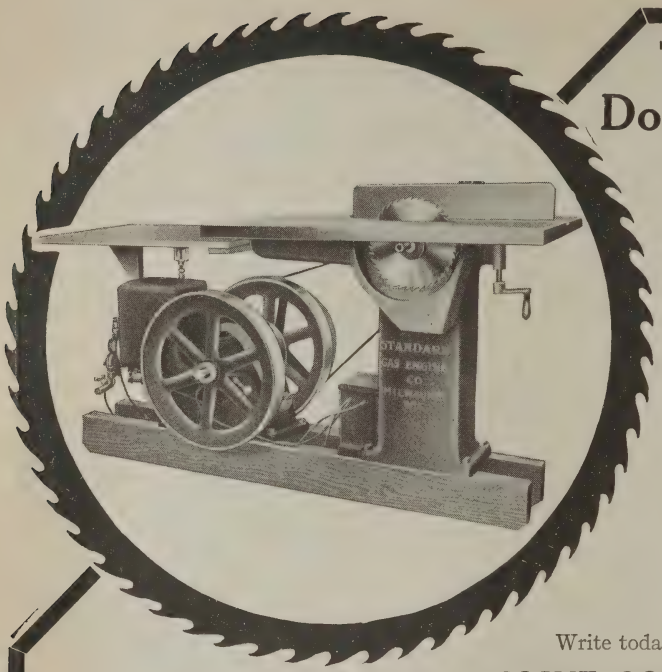
THE LA PLANT HEAVY HOUSE MOVING TRUCKS ARE MADE OF STEEL

On scientific lines—are interchangeable so they can be worked singly, in pairs or in fours.

WRITE FOR CATALOG N

and see how easy it is to wheel a building a mile in a day—and how little the cost is for La Plant outfit compared with the profit to be made in moving houses instead of wrecking them.

LA PLANT TOOL CO.
900 E. Nevada St., Marshalltown, Iowa



This Saw Rig Does 5 Men's Work

Carpenters, Contractors, Lumber Dealers, Job Shops, etc., can save 5 men's time by using one of our

STANDARD

Saw Rigs

They are the most rigid and practical Woodworkers on the market—economical in fuel, dependable in service and right in price.

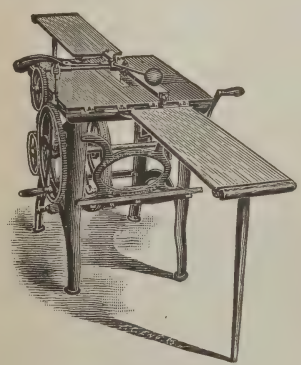
Satisfaction or Money Back

Outfit is shipped ready to run with oiler, wrenches, cross-cut saw, rip saw, dado-head and emery wheel.

Write today for prices and other information.

STANDARD GAS ENGINE COMPANY, Inc.

5th Floor, Caswell Building **Milwaukee, Wisconsin**

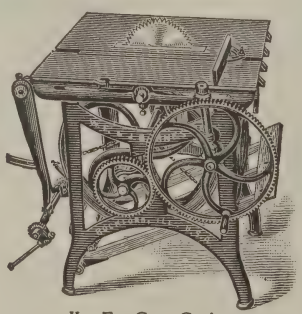


I. For Ripping.

Carpenters! Builders!

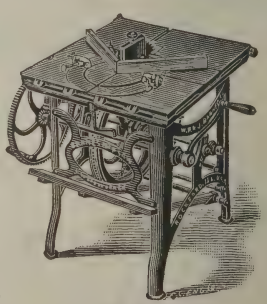
OUR new foot and hand power Circular Saw No. 4, is the strongest, most powerful and in every way the best machine of its kind. For ripping, cross-cutting, boring, grooving, dadoing, etc.

SEND FOR OUR NEW CATALOGUE on Foot and Hand Power Machinery, Lathes, Scroll Saws, Formers, Mortisers, Tenoners, Etc.



II. For Cross Cutting.

Solid Iron Table Planed Perfectly True—Countershaft If Desired



III. With Universal Mitre Gauge

W. F. & JOHN BARNES CO.

436 Ruby Street :: :: :: ROCKFORD, ILL.

MAKE IT SAVE YOU TEN DOLLARS BEFORE YOU EVEN THINK OF BUYING IT

Try Out the Eveready on a Job One Week Free. Send for the Eveready Without Promising to Buy It

You are Wholly Welcome

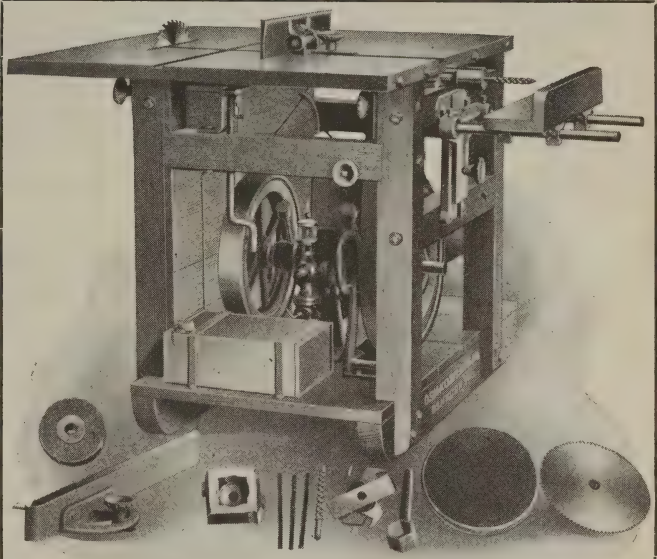
to the use of an Eveready "portable private planing mill" for six days. We will deliver it, and take it away (if you'll let us—**but you won't!**) and you won't be obligated to one solitary thing. THAT'S HOW GOOD IT IS! In your week's Free Trial it will surely save you Ten Dollars if you keep it half-way busy.

Easily Outdoes 25 Men

No six men on any job of yours could possibly do merely the sawing jobs the Eveready will handle with one man and a gallon of gasoline! And fast, fine sawing is only part of the profit-service the Eveready can give you! For it

Outfits You with Your Own Planing Mill

Get the fact that a quarter a day runs this planing mill and saw mill. Does Jig Sawing, Dadoing, Tenoning, Boring, Mitering, Sanding —FREE attachments with every Rig.



TRADE OSHKOSH MARK Eveready SAW RIG

"Guaranteed for Life"

Let the Eveready Cut Your Cost Ten Per Cent!

You can bank on every assertion made here for this outfit, because we invite you to test it—on your own work—in your own way—six days free. Take it and try it and see it make a place for itself on your work that nothing else can fill.

Tell Us on Your Letterhead that You are in Line for an EVEREADY "Show Me" Demonstration.

Your only obligation will be to KEEP TRACK OF WHAT IT DOES FOR YOU, so you'll know its value. Leave the rest to us.

OSHKOSH MFG. CO., 414 South Main Street **Oshkosh, Wis., U.S.A.**

DOES SIX MEN'S HAND SAW JOBS COSTS ABOUT A QUARTER A DAY FOR POWER

"A Complete Planing Mill in itself"

Famous Universal Woodworker

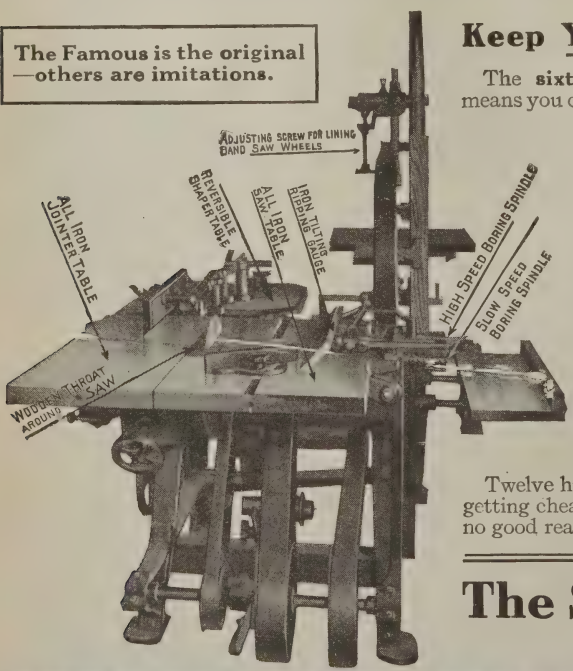
When you buy a Famous you are not paying for other men's experiments

The purchase price of **any** woodworker is too large to warrant your **taking chances.** The investment **necessitates** careful consideration of every **feature** of every **machine.**

We have **always** advised comparison of the **FAMOUS** with other makes of universal woodworkers. And on the strength of the **comparisions** over twelve hundred and fifty **FAMOUS** machines are in use today.

Will you **invest** in a **FAMOUS** or **speculate** in an imitation? It's similar to investing in gilt-edge bonds or speculating in mining stock—the only difference being the larger dividends and **safer** dividends, from a **FAMOUS** than from imitations.

The Famous is the original —others are imitations.


ADJUSTING SCREW FOR LINING BAND SAW WHEELS
REVERSIBLE SHAPER TABLE
ALL IRON SAW TABLE
IRON TILTING RIPPING GUAGE
ALL IRON JOINTER TABLE
HIGH SPEED BORING SPINDLE
SLOW SPEED BORING SPINDLE
WOODEN THROAT FOR SAW

Keep Your Profits Yourself

The **sixteen machines** comprised by the **FAMOUS** means you can **do more work;** the simplicity of construction means you can do it **quicker;** the labor-saving features mean you can do it **cheaper** than with any other similar machine made.

Can you **afford** to pay part of **your** profit to **planing mills?** If **not,** you need a **FAMOUS!** Do you want to put **all** your own profits in your **own** pocket? If so, you need a **FAMOUS!** Do you want to get out your mill work **on time**—without having to wait the pleasure of a planing mill? If so, you need a **FAMOUS!** If you want to save the cost of labor—if you want to save a large machinery investment—if you want a complete planing mill at the price of one machine —you need a **FAMOUS.**

Cheaper Millwork

Twelve hundred and fifty contractors and carpenters are getting cheaper millwork than ever they did before—there's no good reason why you should not do the same.

The SIDNEY TOOL CO.

SIDNEY, OHIO

What Carpenters Contractors and Builders think about it!

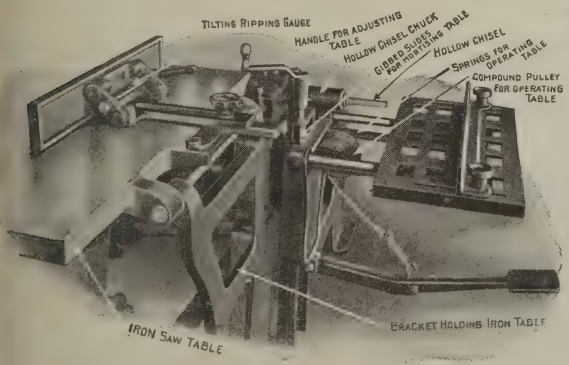
Twelve Hundred (1200) In Use

16 Machines In One

When you buy a **FAMOUS** Universal Woodworker you get sixteen machines in one, as follows:

27 inch Band Saw
12 inch Jointer
Saw Table (with raising and lowering arbor)
Single Shingle Shaper
Borer
Pony Planer
Tongue and Pole Rounder
Hollow Chisel Mortiser
Single End Tenoner
Drum Sander—Disc Sander
Emery Grinder
Knife Grinder
Band Re-Saw
Spoke Tenoner, Rim Borer and Wheel Equalizer
Adjustable Felloe Rounder

The Saw Table and Ripping Gauge are made of IRON



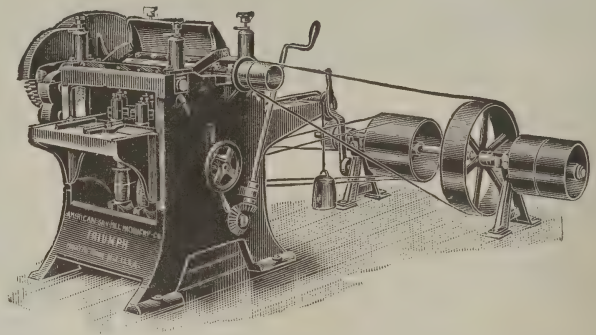
Four men can operate at one time on four different attachments. Not much floor space is required.

We also build the **FAMOUS** Portable Universal Woodworker—a machine that is self-contained, with its own power plant and belting, and which can be moved around from place to place.

Send us your name on a postcard and get full particulars—you gain nothing by waiting and **something** by writing at once.

The SIDNEY TOOL CO.
SIDNEY, OHIO

American "Triumph"
Planer, Matcher and Moulder



Here is a machine which is so far ahead of any other supposedly in its class that there is really no comparison. You must study it, detail by detail—or let us tell you more about it than we have space for here—to realize its many advantages.

One thing we want to emphasize. **The "Triumph," though a small machine, turns out work as uniform, accurate and high in quality as the largest, most expensive machines.**

The explanation is that the "Triumph" is better designed, more strongly and rigidly built, has a higher class of workmanship and more attention to the fine details, than any other small planer.

We could not make the "Triumph" Planer better than it is if we charged twice the price for it.

Here is what the small mill or shop or contractor equipped with a "Triumph" can do:—planing and matching; working flooring, ceiling, siding, casing, wainscoting; a large variety of moulding and trim.

Write us at once for the "Triumph" pamphlet. See for yourself what splendid value the "Triumph" is. And be convinced.

American Saw Mill Machinery Co.

80 Laight St., HACKETTSTOWN, N. J. **1650 Hudson Terminal, NEW YORK CITY**

BUILDER ALSO OF THE

"American" Contractors Portable Variety Wood-Worker

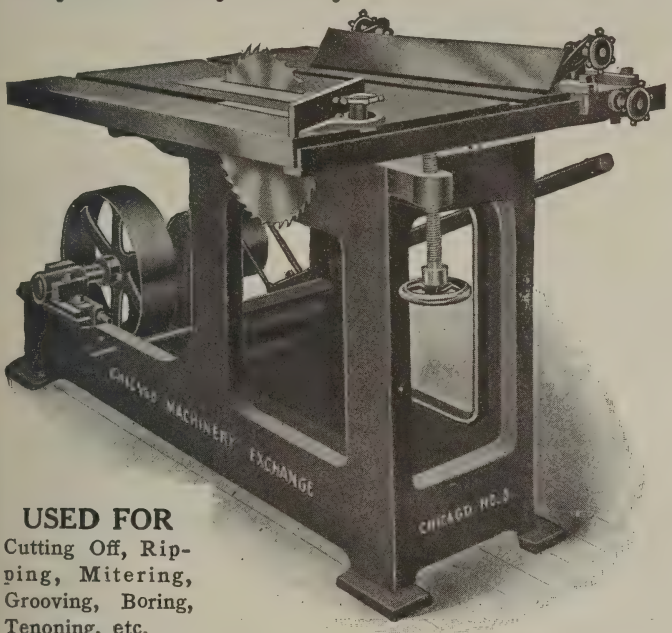
$144.00 FOR BOTH

To Contractors and Builders

These Two Machines are the Best "Buy" You Can Find Anywhere

They Are Always Ready for Work Without Any Changing and will stand the hardest kind of usage without getting out of order.

Our low price of $144.00 for the 2 machines includes belt for saw arbor, countershaft, one 12 in. rip saw, one 12 in. cut-off saw, five boring bits—1/4 in., 5/16 in., 3/8 in., 1/2 in., 3/4 in.—and countershaft, one pair of knives and guard for jointer.



USED FOR
Cutting Off, Ripping, Mitering, Grooving, Boring, Tenoning, etc.

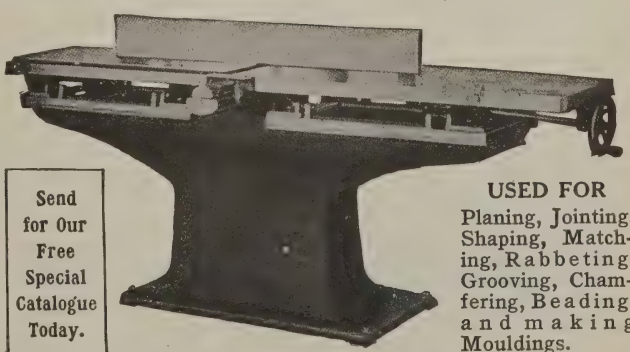
Chicago No. 5 Combination Saw Table

Ask for Price on One if You Cannot Use Both

THE WORLD'S LARGEST AND MOST COMPLETE STOCK of Woodworking Machinery, Tools, and Supplies—everything for the woodworker.

We issue a Catalogue of Machines Especially Adapted to Contractors' and Builders' Use.

Send for Our Free Special Catalogue Today.



USED FOR
Planing, Jointing, Shaping, Matching, Rabbeting, Grooving, Chamfering, Beading, and making Mouldings.

Chicago 12-Inch Jointer and Planer

Chicago Machinery Exchange

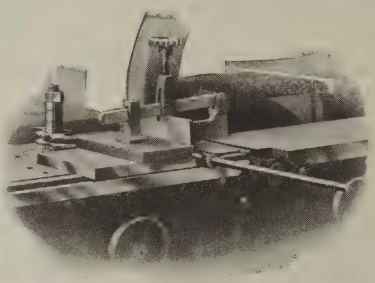
1217 to 1225 Washington Blvd. Chicago, Ill.

The No. 51 Crescent

WILL INCREASE YOUR PROFITS

It Will Cut Down Your Cost, Save Delays, and Enable You to Do More Work and Better Work This Season than You Have Ever Done Before

If you could just see this machine in operation and see how easily it does its work, if we could just get you to understand how convenient the machine is and how well adapted it is for just the kind of work you have to do, we would not have to ask you a second time to place your order. You would buy the machine without urging.

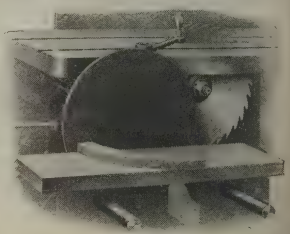


A tenoner attachment can be furnished at very low price and will soon pay for itself on many kinds of work.

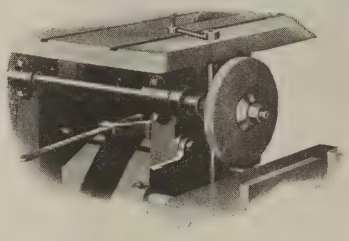
A knife grinder can be furnishe as an extra and is very convenie for grinding planer knives.

Pressure springs hold the work place. This is a regular feature of the No. 51 CRESCENT Univers

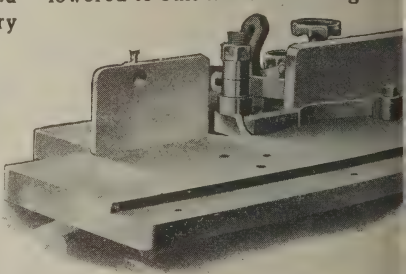
See how the jointer and shaper can be used to straighten one side and one edge of a piece at the same time. This is a regular feature of the No. 51 CRESCENT Woodworker.



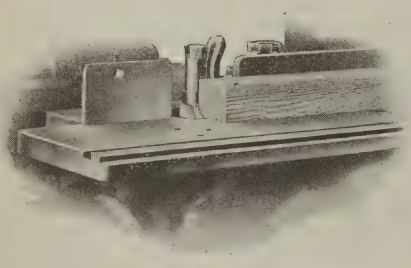
This is a good view of the di grinder. The disk is 14 inches diameter. Table can be raised a lowered to suit the work being don



An emery wheel may be attached to the borer spindle and is very convenient for grinding tools.



It is a very easy matter to work qua ter round or moulding on the shap spindle. The pressure spring hol the work securely up against the fenc



Poles and shafts can easily be rounded on the shaper spindle. This feature will appeal to the wagon and carriage builder. All you need to do this work is the special knives.

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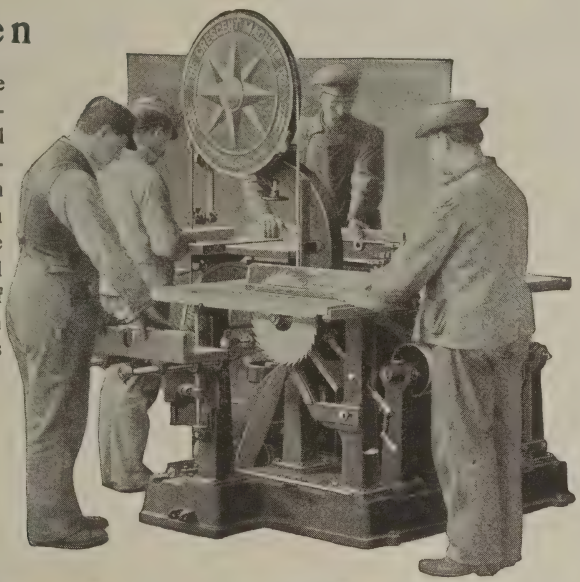
10 Main Stree

Universal Woodworker

Four Men

can work on the No. 51 CRESCENT Universal woodworker without intefering wfth each other. Each machine may be started and stopped independent of any other and each workman controls his own work.



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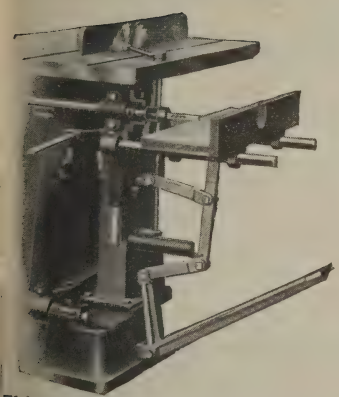
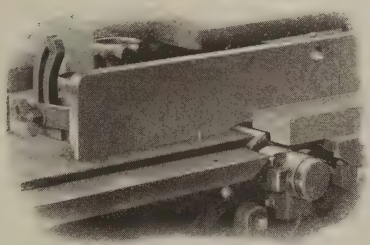


This attachment converts the borer into a hollow chisel mortiser, suitable for cutting mortises up to 5/8 inch square.



This shows how to do rabbeting on the jointer. You can't do it on every jointer but you can on a CRESCENT. The operation is fully explained in the special circular of the No. 51 Universal woodworker.

A panel raising attachment can be supplied at a slight additional charge. This is a desirable feature for many classes of work.

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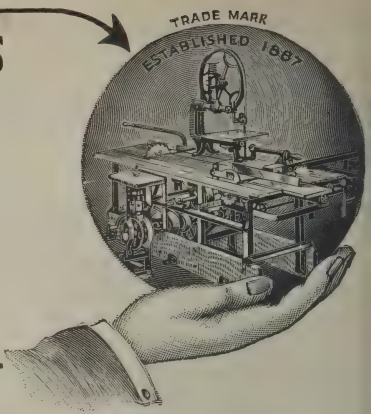

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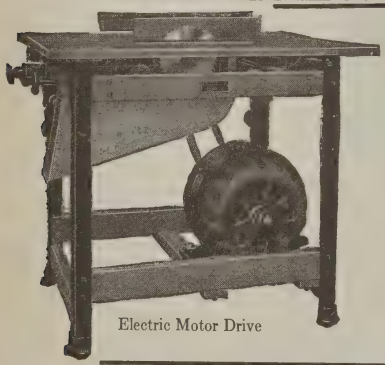

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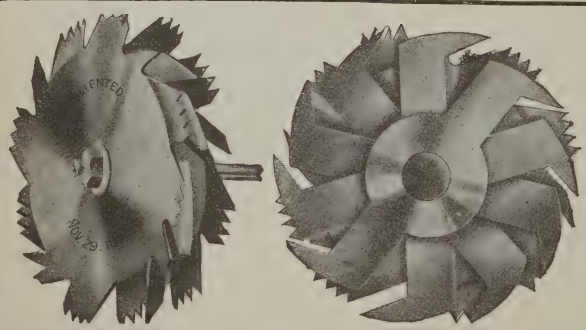

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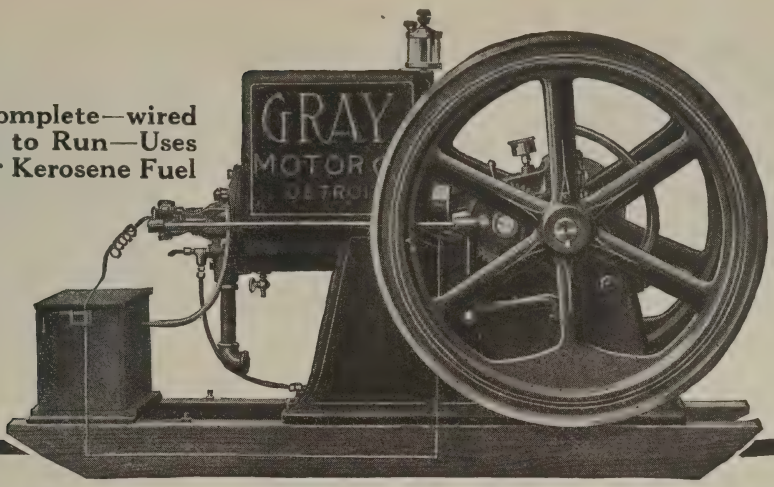

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Especially well adapted to running the various wood-working machines advertised in this publication.

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Runs in any kind of weather—requires very little attention—furnishes **big** power or little power as required, and uses fuel in proportion to the power used—the automatic governor works perfectly.

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The first cost of this high grade—guaranteed engine is only a small consideration—they make a paying investment.

The cost for fuel is very small—will run **all day** doing the work of from 2 to 4 men at a cost of from 20 to 40 cents, depending upon the work to be done and the power needed.

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The engine shown above is a 4 H. P.—it delivers **big honest horse power too**—it's the engine that will answer the requirements of a big majority of contractors and builders.

In some cases a larger engine might be required or a smaller size might do the work you have to do.

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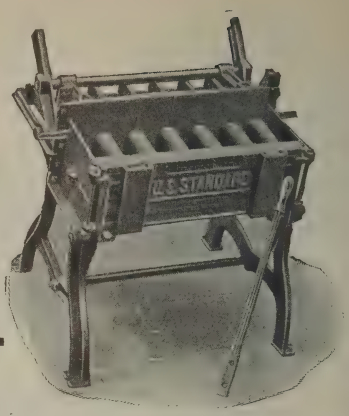

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are accurate, convenient and economical in operation—and are sold at a most reasonable price.

¶ The measuring and proportioning of the cement, sand, gravel or crushed stone is done automatically, positively without variation, regardless of whether materials are fine or coarse, wet or dry.

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It tells all about them.

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¶ Three men with one U. S. Standard Block Machine and one U. S. Standard Mixer have made over 400 8x8x24 inch blocks in 10 hours, and we have the proofs to show.

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¶ The variety and beautiful style of blocks made on both machines makes them unexcelled for contractors and builders manufacturing their own cement blocks. Write for full information and Catalogue B.

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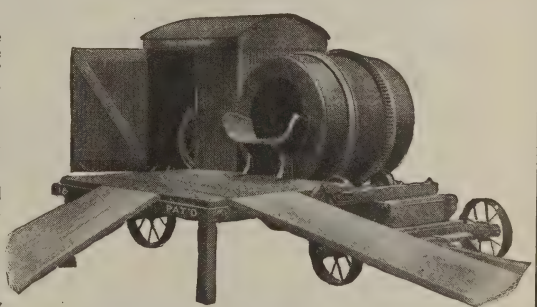
"The Standard" easy running avoiding unnecessary friction, requires less power, less fuel and less attendance.



"The Standard" moderate weight machine can be easily moved from job to job, avoiding excessive freight charges or heavy hauling expense. The moderate weight machine can also be located any place on the job, often avoiding much manual labor.

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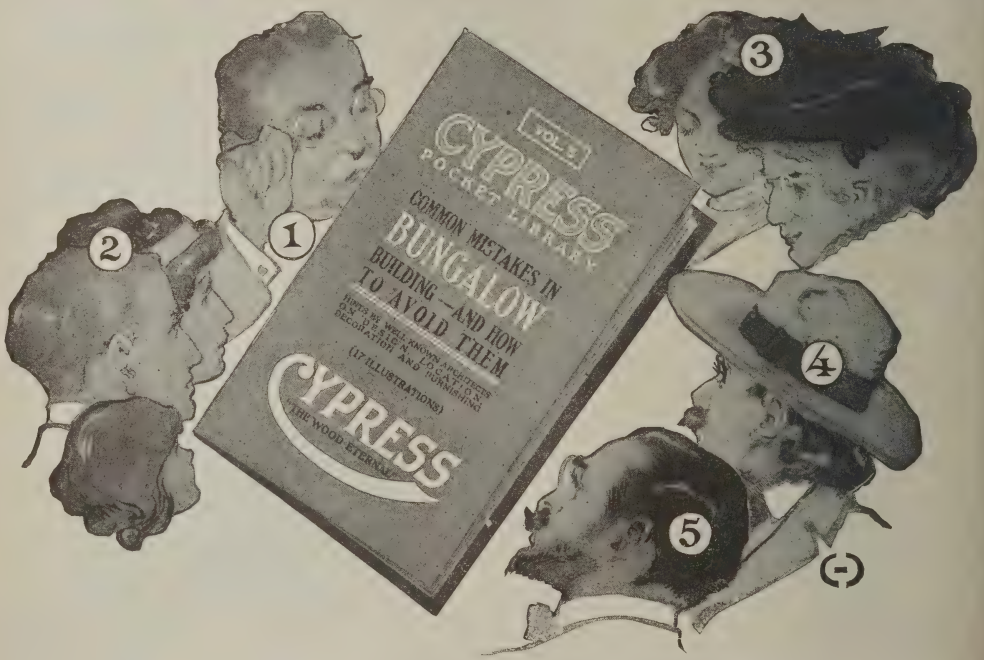

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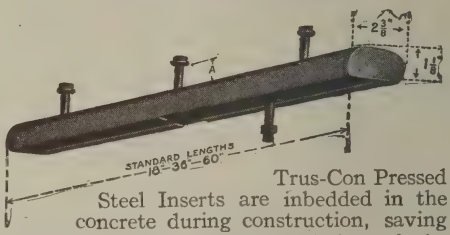

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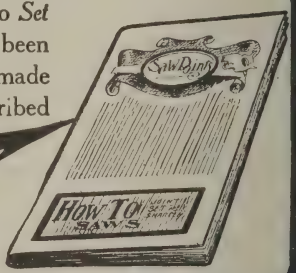

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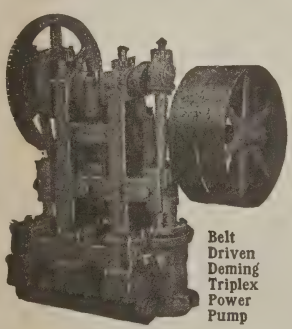

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Photograph of New Rolls of Quilt. Note narrow space in middle for splitting into 18" strips.

THE NATIONAL BUILDER

Vol. 54 (48th Year) CHICAGO, JUNE, 1912 No. 2

The Union City Residence, built at Union City, Ind.
Charles H. Lipp, Architect, Union City.

NATIONAL BUILDER DESIGN NO. 354.

For Floor Plans, Details, etc., see Supplement of this number. Estimated cost, architect's fees not included, $3,850.75.

Estimate of Union City Residence

By CHARLES H. LIPP

EXCAVATING AND MASONRY.

190 yds. exc., 30c	$ 57.00
110 ft. concrete footing, 25c	27.50
14,500 brick laid in wall, $12 per M.	174.00
370 ft. lineal cut and dressed limestone, 8x8, at 30c per lin. ft.	111.00
30 lineal ft. chimney, 60c	18.00
90 yds. cement floor in basement, 65c	58.50
Cement steps	25.00
Total masonry	$471.00

LUMBER BILL.

Pcs.		Feet.
1	2x10x18 box sill	30
104	2x10x16 box sill and floor joists.	2,773
12	2x10x14 floor joists	280
1	2x10x10.	17
2	2x8x20 veranda arch	53
3	2x8x18 box sill	72
10	2x8x16 box sill	213
25	2x8x14 veranda joist and box sill.	467
4	2x8x10 veranda arch	53

10 2x6x20 main rafters	200
31 2x6x18 ceiling joist	558
14 2x6x16 ceiling joist and rafters	224
25 2x6x14 ceiling joist and rafters	350
36 2x6x12 ceiling joist and rafters	432
8 2x6x10 rafters	80
15 2x4x18 plates	180
31 2x4x16 plates	331
37 2x4x14 plates	345
47 2x4x12 ceiling joist, veranda and rafters	376
507 2x4x10 studding	3,380
100 2x4x9 inside partition	600
Total	11,015
11,015 ft. framing lumber, $22	$242.33
2,600 ft. No. 2 sheathing, 10", $22	57.20
1,800 ft. No. 2 roof sheathing, 6" and 8", $22	39.60
2,400 ft. 1x4 No. 2 dead floor, $22	52.80
2,500 ft. ½x5 clear R. W. siding, $26	65.00
80 ft. 1x4 edge grain flooring porch	3.20
350 ft. 1x3 clear cypress flooring, $60	21.00
40 squares waterproof building paper	20.00
Total lumber bill	$501.13

MILL WORK.

1 cellar door frame, 2' 6"x6' 6"	$ 2.00
2 cellar door frames, 3'x6'6"	4.00
4 cellar window frames, 12"x15", 3 L.; 4 cellar window frames, 12"x15", 2 L.	14.00
1 O. S. D. frame, 2/8x6/8, clear cypress; 1 O. S. D. frame, 3'x7' 6"; 1 O. S. D. frame, 2' 8"x7' 6"	7.50
1 Sk. B. W. fr., 30"x30", 2 L.	2.25
2 Sk. B. W. fr., 20"x30", 2 L.	4.50
3 Sk. B. W. fr., 32"x30", 2 L.	6.75
2 Sk. B. W. fr., 26"x30", 2 L.	4.50
1 twin W. fr., 20"x18", 2 L.	4.00
1 Sk. B. W. fr., 36"x24", 1 L., jib head.	2.25
1 Sk. B. W. fr., 20"x18", 1 L., jib head.	2.00
1 Sk. B. W. fr., 36"x24", 2 L.	2.25
1 Sk. B. W. fr., 24"x24", 2 L.	2.00
8 Sk. B. W. fr., 24"x28", 2 L.	20.00
2 plank fr., 36"x26", 1 L.	3.50
3 whole, 2 half columns, 10"x10".	24.00
37 ft. balustrade, 50c	18.50
52 ft. porch breast, 40c	20.80
50 ft. porch base	3.25
450 ft. ½"x4" clear S. Y. P. ceiling.	11.25
140 ft. main cornice	36.40
125 ft. O. S. base, 6c	7.50
4 sets corner boards, with bead	6.00
200 ft. cornice for porch and bay window.	12.00
1 quartered oak door, 3'x7' 6"x1¾; 1 quartered oak door, 2' 6"x6' 6"x1¾; 1 quartered oak door, 2'8"x7'6"x1⅜; 1 quartered oak door, 6'x7'6"x1¾; 1 quartered oak door, 5'6"x7'6"x1¾	61.53
1 mirror plate, 20"x60"	8.00
1 art glass in copper, 24"x58"	24.80
1 D. 2'8"x6'6"x1⅜, 1 L., No. 1 W. P.	4.50
1 D. 2'8"x7'6"x1⅜, 1 L., No. 2 W. P.	4.50
1 D. 2'8"x6'8"x1⅜, 1 L., No. 2 chip.	4.50
2 D. 2'8"x7'6"x1⅜ cross pan, No. 1 W. P.	4.00
1 D. 20"x30"x⅞	.80
2 D. 16"x16"x⅞	1.20
1 D. 2'6"x6'6"x1⅜, No. 1 W. P.	2.75
5 D. 2'6"x6'6"x1⅜ cross pan, No. 1.	13.75
5 D. 2'6"x6'6"x1⅜ cross pan, No. 1.	13.25
2 D. 3'x6'6"x1⅜, for cellar, No. 3	4.00
1 D. 2'6"x6'6"x1⅜, for cellar, No. 3.	1.80
4 sash, 12"x15", 3L., 1⅜	4.00
4 sash, 12"x15", 2 L., 1⅜	2.50
2 sash, 36"x26", 1 L., 1⅜, Queen Anne.	9.00
8 W., 24"x28", 2 L., 1⅜, D.E.A.gl	18.00
1 sash, 36"x24", 1 L., 1⅜, chip gl.	1.50
1 sash, 36"x24", 1 L., 1⅜ D. S. A.	1.35
1 sash, 20"x18", 1 L., 1⅜ chip	.75
1 W., 36"x24", 2 L., 1⅜ D. S. A.	2.70
1 W., 24"x24", 2 L., 1⅜ D. S. A.	1.90
2 W., 20"x18", 2 L., 1⅜	2.60
3 W., 32"x30", 2 L., 1⅜	11.25
2 W., 26"x30", 2 L., 1⅜	5.40
2 W., 20"x30", 2 L., 1⅜	4.00
1 W., 30"x30", 2 L., 1⅜	3.25
1 single sliding door frame, 6'x7' 6", quartered oak; 1 single sliding door frame, 5'6"x7'6", quartered oak; 1 T. S. door frame, 2'8"x7'6", 1⅜ R., quartered oak; 1 T. S. door frame, 2'6"x6'6", 1¾R., quartered oak	10.00
2 T. S. door frames, 2'8"x7'6", 1⅜ R. S. Y. P.; 6 T. S. door frame, 2'6"x6'6", 1⅜ R. S. Y. P.; 5 T.	

S. door frames, 2′0″x6′6″, 1⅜ R. S. Y. P.	10.40
15 quartered w. oak steps, 1⅛x 11½x3′; 2 pieces quartered w. oak nosing, 1⅛x4″x3″; 17 quartered w. oak risers, ⅞x7″	17.00
1 panel newel, 6″x6″x4′6″, quartered w. oak; 1 platform newel, 5″x5″x6′6″, quar. w. oak; 1 landing newel, 5″x5″x6′, quar. w. oak; ½ landing newel, 5″x5″ x6′.	14.00
18 ft. stair balustrade, quar. w. oak.	12.60
325 ft. 5/16x2 quar. w. oak flooring border	26.00
400 ft. ⅞x2 Y. P. flooring field	12.00
18 ft. 1x12 wall skirt, Q. W. O.; 20 ft. 1x12 pan. skirt, Q. W. O.; 46 ft. 1x2 pan. skirt strips, Q. W. O.; 46 ft. ¾x¾ pan. mould., Q. W. O.	5.98
2 porch sash, 14x30, 2 lt.	3.00
2 porch sash, 10x30, 3 lt.	3.20
2 porch sash, 16x30, 1 lt.	1.80
2 pair doors, 18x52, No. 1 S. Y. P., pantry	4.00
1 pair doors, 18x28, No. 1 S. Y. P., pantry	1.60
2 doors, 15x28, No. 1 Y. S. P., pantry.	1.50
1 door, 15x21, No. 1 S. Y. P., pantry	.70
1 rear porch column, 8x8x10′	4.00
200 ft. 1x4x12 S. Y. P. ceil. porch	7.00
2 pcs. 6x6x10 poplar porch posts	3.60
2 pcs. 3x6x10 poplar porch posts	1.80
100 ft. lumber for porch frame, etc.	6.00
150 ft. lumber for pantry	6.75
Total mill work	$ 712.20

CARPENTER LABOR.

11,015 ft. framing lumber, $11	$ 121.16
2,600 ft. sheathing, 45°, $10	26.00
1,800 ft. roof sheathing, $9	16.20
2,400 ft. dead floor, 45° angle, $10; do second floor	24.00
2,500 ft. 5″ siding, $14	35.00
755 ft. finish floor, $20	15.10
Labor on two gables	12.00
Porch work	18.00
52 ft. ver. breast, 40c	20.80
50 ft. ver. base, 6c	3.00
140 ft. main cornice work, 20c	28.00
200 ft. cornice work porch and bay, 12c.	20.00
125 ft. outside base, 5c	6.25
450 ft. ceiling, $1.50	6.75
24 sets S. Y. P. casing, second floor; 5 sets S. Y. P. casing, closets; 10 sets S. Y. P. casing, first floor	31.20
16 sets quartered w. oak casing	36.00
155 ft. quartered w. oak base, 10″.	20.25
54 ft. Y. P. 10″ base	3.24
200 ft. Y. P. 8″ base	9.00
100 ft. 1″x4″ strips for hooks	1.50
100 ft. 1′x16″ Y. P. shelving	6.00
Attic stairs	4.50
Cellar stairs	6.00
100 ft. clear S. Y. P. flooring, dumb waiter	3.00
Veranda work not specified, rail, etc.	24.00
Finishing 8 cellar w., 75c	6.00
3 cellar doors, $1	3.00
3 rear O. S. doors, $2	6.00
Front door	4.50
2 sliding doors	16.00
15 hinge doors	37.50
23 windows, $2	46.00
2 attic windows	3.00
Pantry cupboards	30.00
Main stair	35.00
Attic stair	5.00
Cellar stair	5.00
Lumber not specified in closets	8.00
155 ft. Q. O. base, 7c	10.85
54 ft. 10″ 3 member S. Y. P. base, 5c	2.70
200 ft. 8″ 2 member base, 4c.	8.00
325 ft. oak fl. border, $3	9.75
400 ft. S. Y. P. fl. field, $1.50	6.00
Smoothing 2,000 ft. flooring, $1.50	30.00
Incidentals, 10 per cent	64.85
Total carpenter labor	$ 713.41

RECAPITULATION.

Excavation and masonry	$ 471.00
Lumber bill	501.13
Mill work	712.20
Carpenter labor	713.41
Plastering, 875 yds., 26c	236.25
Electric wiring	63.00
Plumbing.	285.00
Hardware and nails	82.40
Slating and sheet metal work	235.00
Painting.	173.00
Furnace, hot air, underground cold air duct of cement	195.00
Incidentals—5 per cent	183.36
Total.	$3,850.75

EDITORIAL

Be sure you know how to do it yourself, before you attempt to teach others the way.

* * *

It is better to teach than to be taught, when you are sure you know it all, for you will discover, by imparting knowledge to others, some things you thought you knew, had been left out of your lessons, and it is a good time to find them when you are teaching others.

* * *

We have stumbled across men who have had a partial training at the bench, in the workshop, or on the building, with a smattering of mathematics and a little knowledge of the use of the tee square and compasses, who would undertake to build or construct anything proposed in architecture, engineering, or decoration, from a Panama canal to a Taj Mahal or Gothic Cathedral, without the least hesitation.

* * *

These sorts are bold men, and doubtless have their uses; but as a rule neither the shop, the cellar nor the roof are suitable places for them. Ordinary workshop labors are not the soils on which such men flourish, in fact they often wither and die when fed on the ordinary remuneration of daily toil. It requires the food of gods to supply these high-brow aspirants with the kind of nourishment their peculiar temperaments demand.

* * *

Perhaps there is no duty a regular builder is called upon to perform, in connection with his calling, so irksome as that of preparing estimates for tenders, or making such other calculations as may be necessary for the furtherance of his business. This reference recalls to the writer many memories, amusing and melancholy, of past struggles in favor of better methods of training our technical workers for the work in which they must spend most of their lives and on which their success in life depends. Most of that work involves a great deal of drudgery. Advance in civilization means the minimization of the drudgery necessary in human life and the resultant freeing of a larger share of our time for higher and more pleasurable pursuits. No drudgery is more wearing out than that of calculation. The drudgery of manual labor has its compensation; it keeps the physical frame fit, and nurses the generation of all the physiological energies. Mental drudgery produces certainly some automatic skill in one special kind of thinking, but beyond this it merely fatigues the brain and all the nervous system. No brain drudgery is more fatiguing than that of practical calculation. But calculation in immense quantities is unavoidable in all technical work. How essentially important it is, therefore, to search out and employ all methods whereby the labor of calculation is decreased.

Some perverse natures take pure delight in calculating for calculation's sake. They would rather spend half an hour in arriving at the desired result in a round-about clumsy manner, than five minutes in doing so by a clean, direct method—this for the simple joy of the extra twenty-five minutes spent in the hard labor of calculation. Fortunately the bulk of the race is not built that way. Higher calculations in new directions in the pursuit of new knowledge are, of course, legitimately fascinating; but it cannot be too thoroughly understood that 90 per cent of the calculations required in any kind of business life are little more than repetitions, with minor variations, of what has been done a million times before. Learning is, or should be, always a pleasant and exhilarating occupation; but, beyond the stage of learning, the use to be made of our calculating faculties is such, that all reasonable men will desire to cut the work as short as possible, and to rigidly eliminate all waste of energy.

* * *

In actual technical calculations pursued in the unhappily common clumsy methods, more time and labor are spent in getting into muddles by losing sight of what is really wanted, and in getting out again of such muddles, in rectifying errors, or in examining to make sure that there are no errors, than in doing what is essentially necessary. Therefore the three fundamental rules of good method in calculation are: (1) Have an absolutely clear idea of what you wish to arrive at before you begin your calculation; (2) throughout the work never for a moment lose sight of, or forget, what your main and ultimate aim is; and (3) make sure of the correctness of each step as you go along. If you fix your attention upon the detail of each step, to such a degree as to forget temporarily your ultimate aim, you will go astray and will, at the very least, lose time by want of directness. If you make a slip in one step and go on without noticing and correcting it, you will be forced to come back to that same step and do twice over all the subsequent work.

* * *

The next most essential condition of good figuring is the clear recognition of the fundamental distinction between correctness and minuteness. The word accuracy is used in both senses, and its ambiguous meaning has led to much lamentable confusion between correctness, or the avoidance of mistakes, such as confusing ft.—lbs. with lbs. or writing down 7x4 equals 38 instead of 28, and minuteness of calculation such as finding the quantity of coal needed for one horse-power hour to the thousandth of a lb., or the cost of a hundred tons of pig iron to one penny, or the volume of excavation in a large cutting to one cubic yard.

* * *

Calculation to an irrational degree of minuteness is not only unnecessary—avoid all fractions whenever it is possible—it is harmful and deceptive. It is injurious in two ways: it wastes time on wholly unfruitful computation, and by amassing inordinate arithmetical detail it greatly increases the risk of gross error. The simpler a calculation is the surer it is in its result. It is deceptive by engendering a false idea that the physical facts are known to the same degree of minuteness. It is both ridiculous and wrong to believe oneself, or to make others believe, that you have measured the horse-power of an engine to the one-hundredth of a horse-power, or that you have ascertained the weight of stone that is to be used in a building to within three or four pounds, or that you know the really safe load beam to within one cwt. Many estimators know well, and freely acknowledge, the limits of accuracy of the various factors they use in a complex calculation, and yet they present their final result in a form of very much finer minute exactitude. If they multiply 43x67, knowing that each of these factors is liable to 1 per cent error, they will state the result as 2,881, not recognizing that this statement is an assertion of ascertained exactitude within 1/30th of 1 per cent, whereas the real product is liable to an error that may be as much as 2 per cent. Thus the calculated statement asserts a minute accuracy 60 times as great as really exists in the physical measurement. Remember also, that it is always better to err on the side of safety and amplitude than to trim too close to the line in the search of exactitude, so far as building matters are concerned.

Emerson House, Salem, Mass.; Side Door.

OLD SALEM DOORWAYS

by Livingstone Wright

IN chasteness and refinement of design, the threshold approaches of the genuine old Salem mansions are unsurpassed. Just as the famous "Bullfinch Front" of the Massachusetts State House endures as the finest work of its kind in America, so are the Salem Doorways in their particular field. Students from the Massachusetts Institute of Technology still make their periodical pilgrimages to sketch the perfect lines and design of the Philip Little house on Chestnut street, while lay lovers of art make their tourist rounds of the venerable mansions to admire the subtle something that is individual here.

To understand the theme of these designs, it is necessary to reflect upon the sources of inspiration.

The Mediaeval architecture of England reached its zenith in the 13th century. This was finally superseded by the Classical of the Renaissance. This supplanting of the native Gothic by a style imported from Italy was a long and tortuous process.

What is called the perfect Gothic prevailed in England from 1399 down through the reign of Henry the Eighth, who died in 1546.

It was about 1509 that Italian work appeared and was first applied to mantels. The scheme of the architects and designers was at first to select the phases of Gothic that seemed best and mingle them gingerly with what they had decided upon as the very best of the Italian work. The new era, once well started, grew with unceasing steadiness. From mantels and incidental embellishment, it spread to the construction of buildings themselves.

In one or two sections of England, the Gothic lingered much longer than in the rest of the Island. Notably was this the case at Oxford, where Inigo Jones designed the garden front of St. John's College for Archbishop Loud.

What we commonly term "the Colonial style of architecture" in America, is divided into three periods, the first, from 1636 to 1675, the second, from 1675 to 1700, and the third from 1700 to 1725.

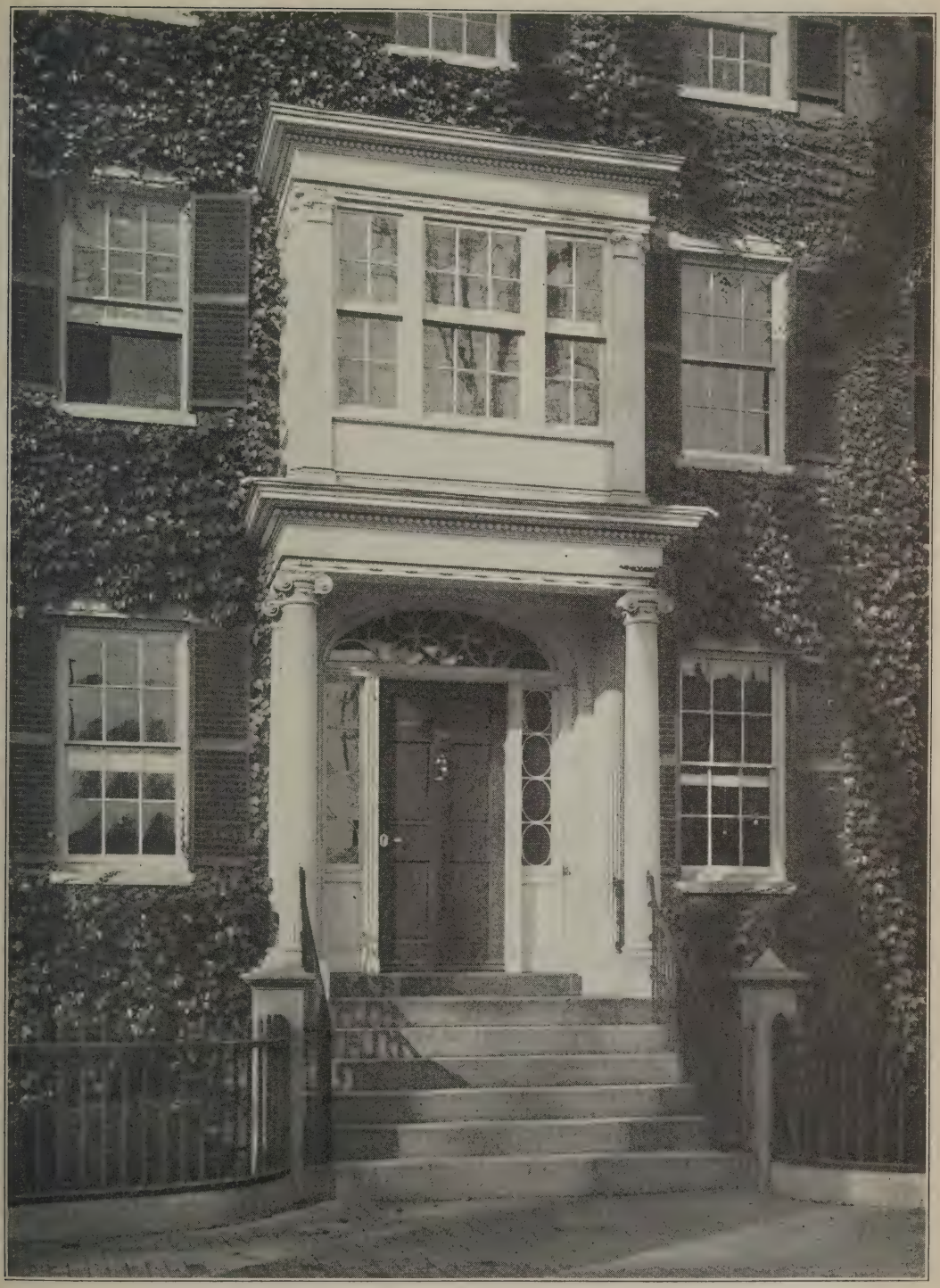
The early colonists with all their stern Puritanism found it easier to follow the object lessons of their English or Dutch birthland and make severe simplification upon the old "half-timbered" fashion of house construction, then prevalent over Continental Europe, than to originate absolutely new and local designs. The houses were set up with posts and studs and for filling there were two sorts, the "wattle and daub," i. e., clay and chopped straw for the five-inch wall, or brick and plaster.

A season or two of New England showed the Colonists that French windows and Flemish fancies were not o'erwell calculated to face the climate of the New England seacoast! What would do in interior England or Southern France soon rattled to pieces under a genuine "down East" coast gale. The

Old Assembly House Doorway, Salem, Mass.

Old Andrew Safford House, Salem, Mass.

Old Colonial House. Now Dr. Pitman's Residence, Salem, Mass.



Old Hoffman House, Salem, Mass.

Old Boardman House, Salem, Mass.

studdings and posts shrank and the wind and sleet forced the constant simplifying and bracing and reinforcing. Thus, there arose the house that was just as severe as the carpenter could make it and thatched with the best scheme that could be devised for keeping out those dreadful coast storms, the Clapboard!

Salem buildings, today, show the whole gamut. The Puritan and Witchcraft severity: the Tory and Colonial elegance of the frame houses of the Revolution, and the regal grandeur of the "Old Sea Captain" days.

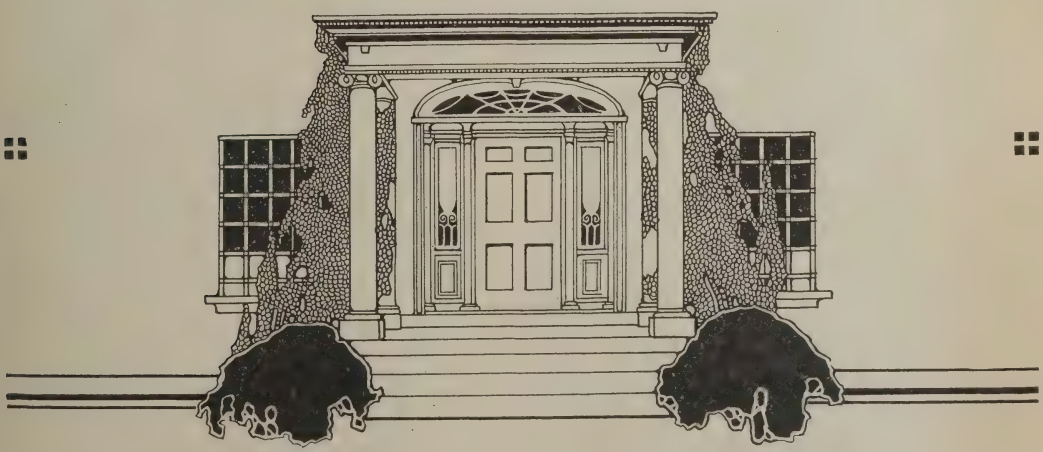
It was during the latter period, from 1800 to 1850, that the utmost art was applied to her famous doorways. In the days when the huge ships of Elias Haskett Derby and others of the merchant princes of Salem were carrying on the vast trade with China and the East Indies that fortunes began to be expended in the construction of the most sumptuous private residences that the art of the day could design. These mansions were of brick and this solidity of material forced a new scheme in decoration.

The great artist in doorways for these Sea Captain and Merchant Prince palaces was Samuel McIntyre. He was a noted wood carver and to his infinite skill and patience the intricately wrought work of these doorways is due. These doorway carvings brought him world-wide fame. The patterns were multitudinous in variations of fruits, vines, flowers and emblems.

The fundamental idea of these doorways had, of course, to be dignity. The dignity must, next, be veiled in elegance. Refinement must be the final, luxurious touch of wealth.

Analysis of these fine porticos will reveal that the eternal beauty and art of Greece is the basis. It is seen in the Corinthian, Doric and Ionic columns. The rugged Gothic still endured in glass and door frame construction. The Renaissance enveloped all in its labyrynth of subtle and intricate ornamentation.

The great effect for the charm of these old Salem doorways is the chill dignity of the background. The areas of heavy brick walls, the awesome square roofs, the fortress-like monuments of brick and mortar gave McIntyre the noblest of backgrounds upon which to work out his beautiful, graceful threshold fancies. He made the most of his opportunities, for the old Salem doorways are veritable cameos wrought upon the solidity of brick and dignity!



Warehouse Doors

By CHAS. CLOUKEY

THE inquiry of a subscriber in the recent issue of THE NATIONAL BUILDER in regard to the layout for factory or warehouse doors, has suggested a short article on the subject, and I will endeavor to illustrate some of the most practical methods of doing this class of work.

As the inquiry specified that the doors were to be made on the job and not in the shop, I have shown four different styles of construction which may be worked out by hand. Fig. 1 shows a rabbet made in the solid for the ceiling panel, and it is made 1⅛ deep in order to get the tenon all in the rabbet. This leaves room for a small mould to be broken around the edge of the ceiling panels, as shown in the section. This is for an inch and three-quarter door, and is the hardest of the lot to make by hand on account of the rabbet in the solid frame.

Fig. 2 shows the proper layout for the stiles and rails for the doors corresponding to the section in Fig. 1, and while there is no standard sizes for doors of this kind, it will be noticed that the stiles and top rails are 5½ inches wide, and the lock rails 7½, and the bottom rails 9½. This is in order to use 2x6, 2x8 and 2x10 material for the frame of the doors without waste in width. The amount of relish on the top and bottom rails is not arbitrary, but is given here as 1½ inches for the bottom and 1 inch for the top. If there is a liability that the doors may have to be cut down an inch or two in length, the rails should be relished back farther, and the mortices made correspondingly narrower.

Fig. 3 shows the style of a door made up of two frames, one of them ⅞ thick and the other 1⅛ thick, making a 2-inch door, and the members of the ⅞ side being enough wider than the others to form a rabbet when the two frames are screwed together. Sometimes they are moulded on both sides as in the figure, and sometimes the moulding on the ⅞ side is omitted. This makes a very strong door, and the same method may be employed in making a door 1¾ thick, except that the ceiling will be flush with the

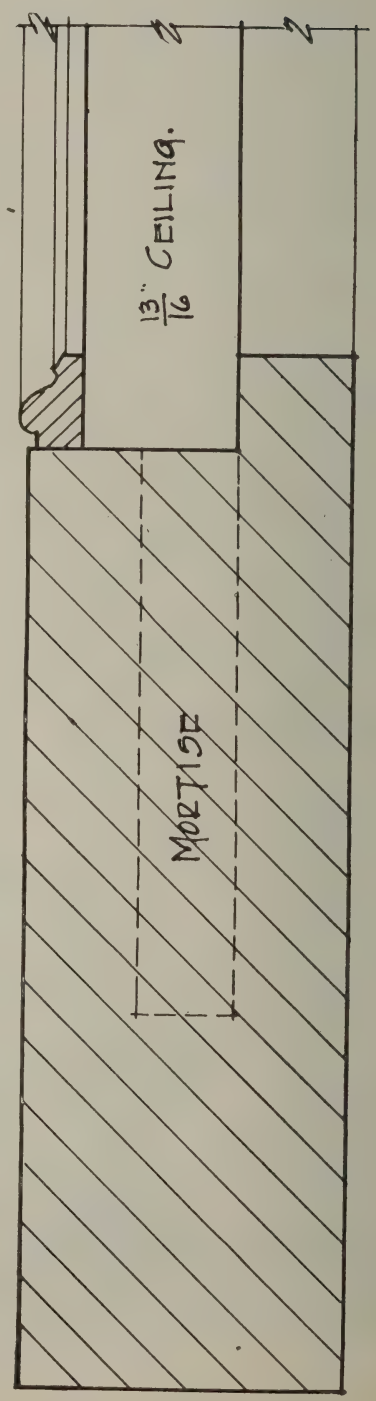


FIG. 1.

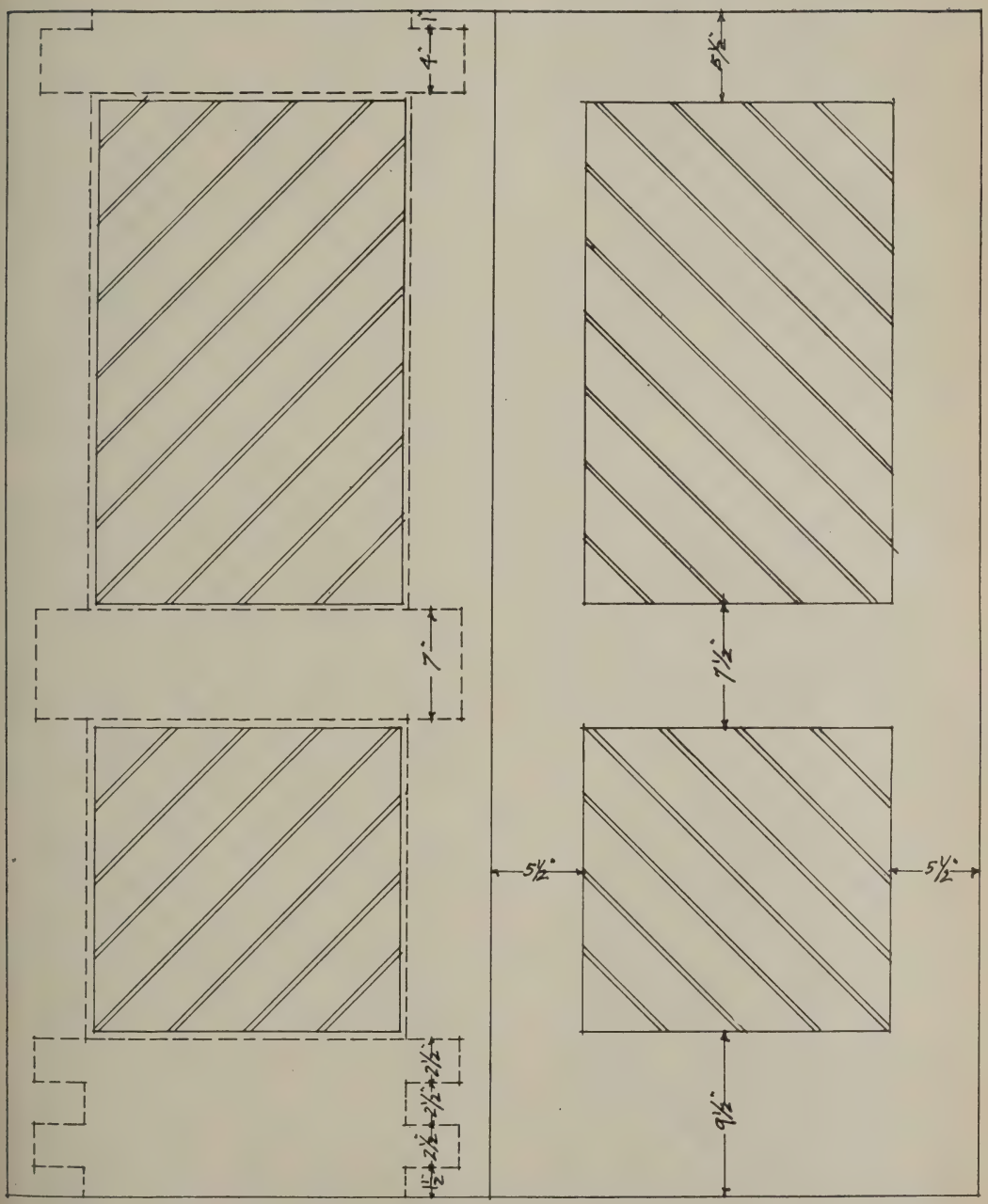


FIG. 2

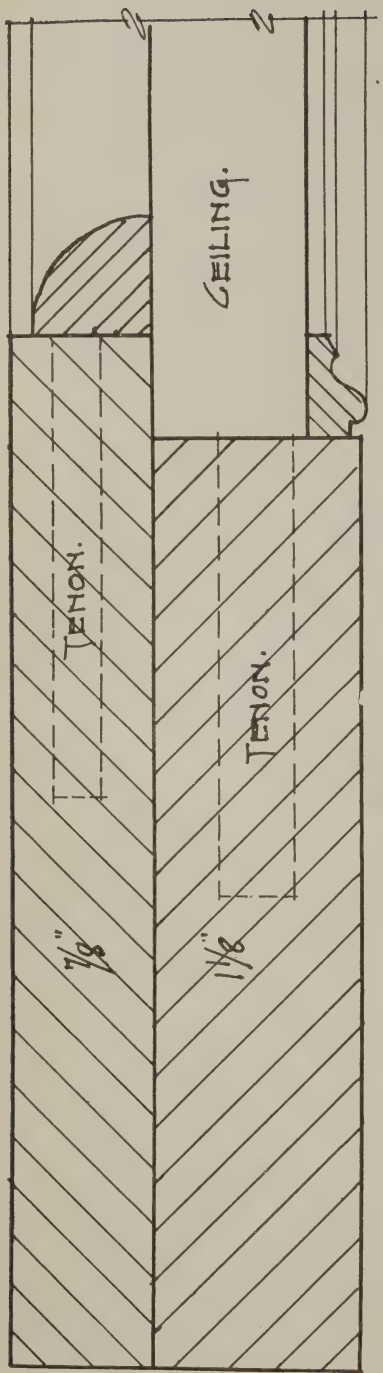


FIG. 3.

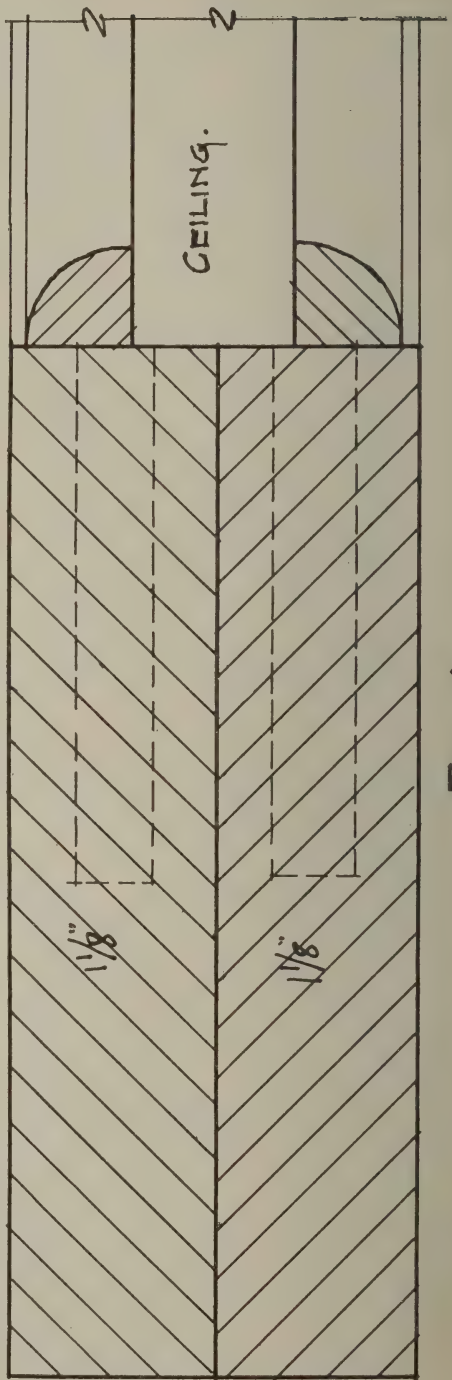


FIG. 4.

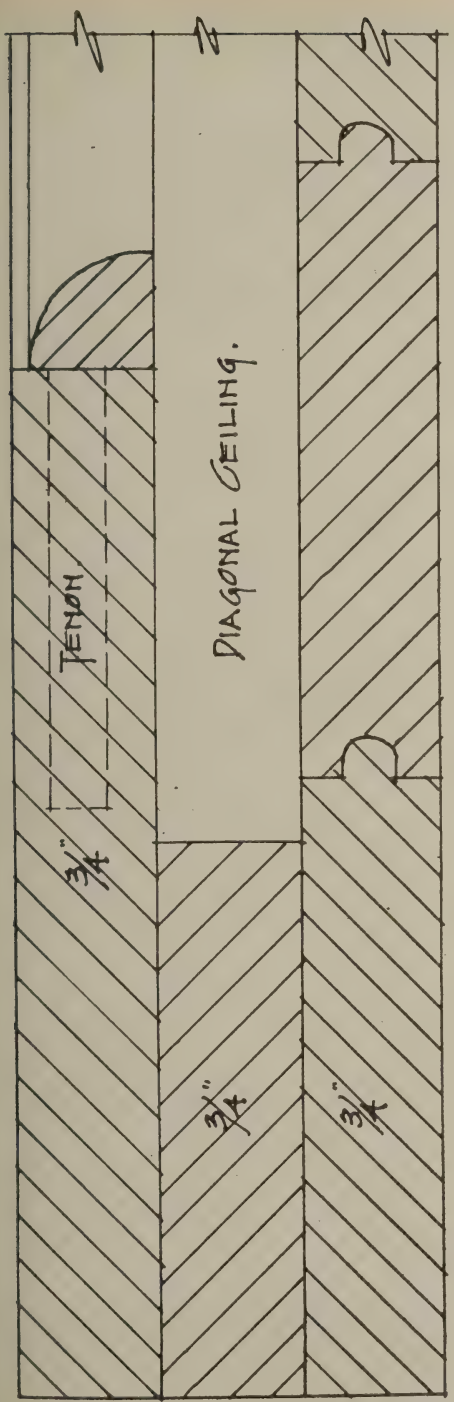


Fig. 5.

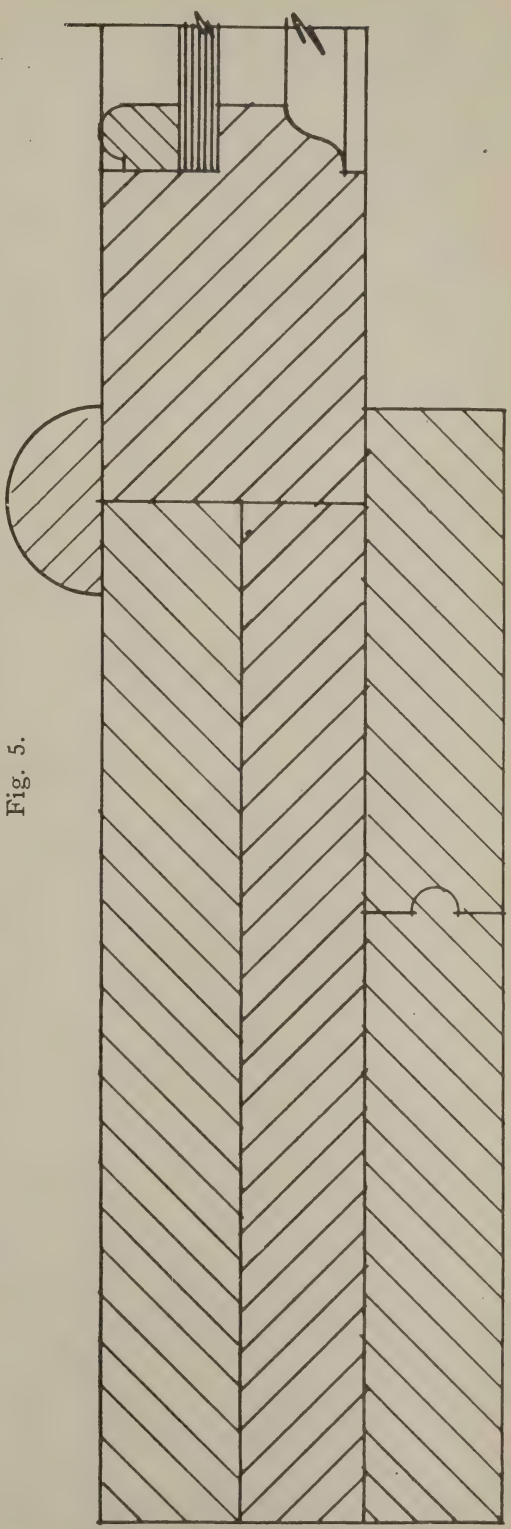


FIG. 6.

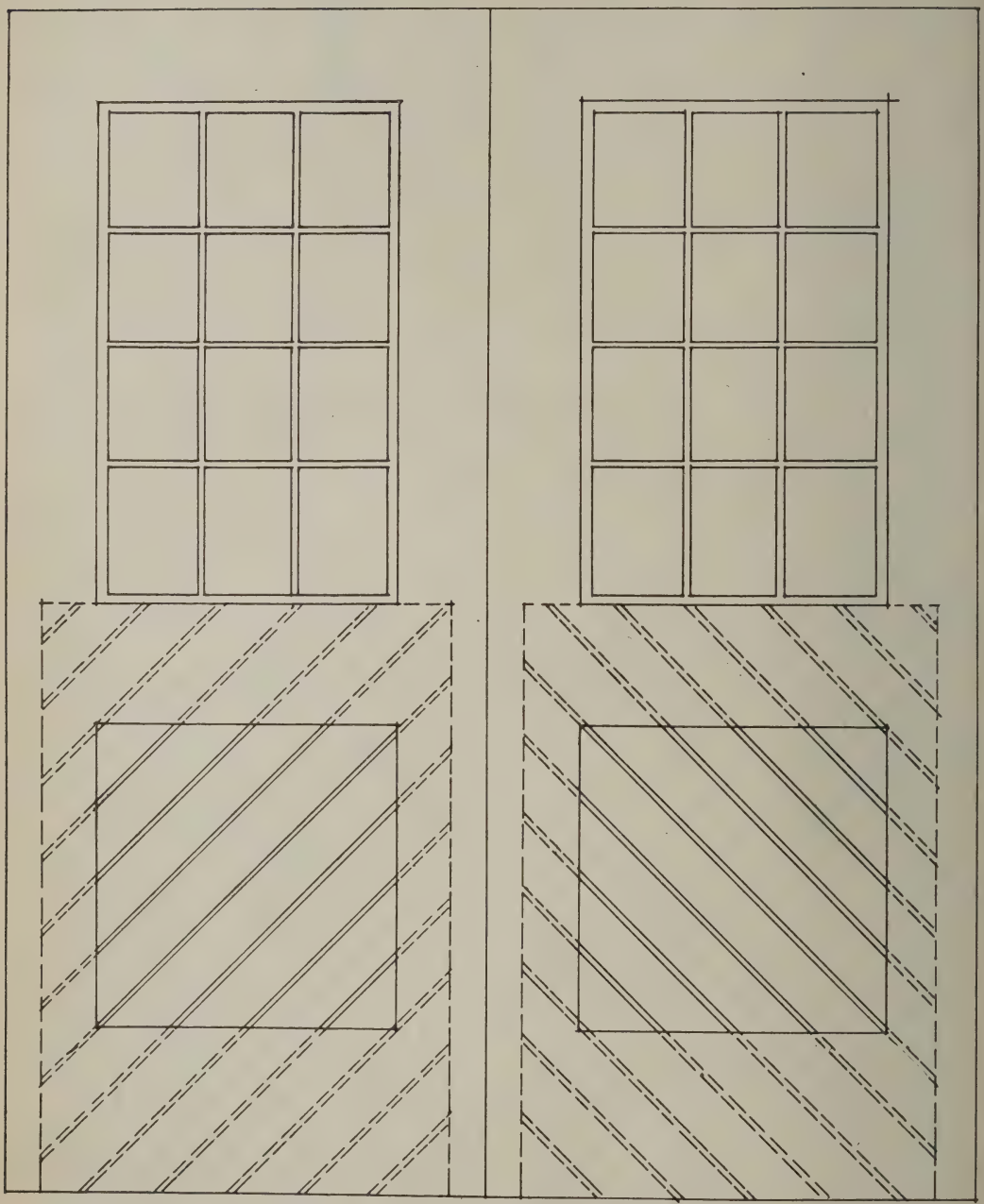


FIG. 7.

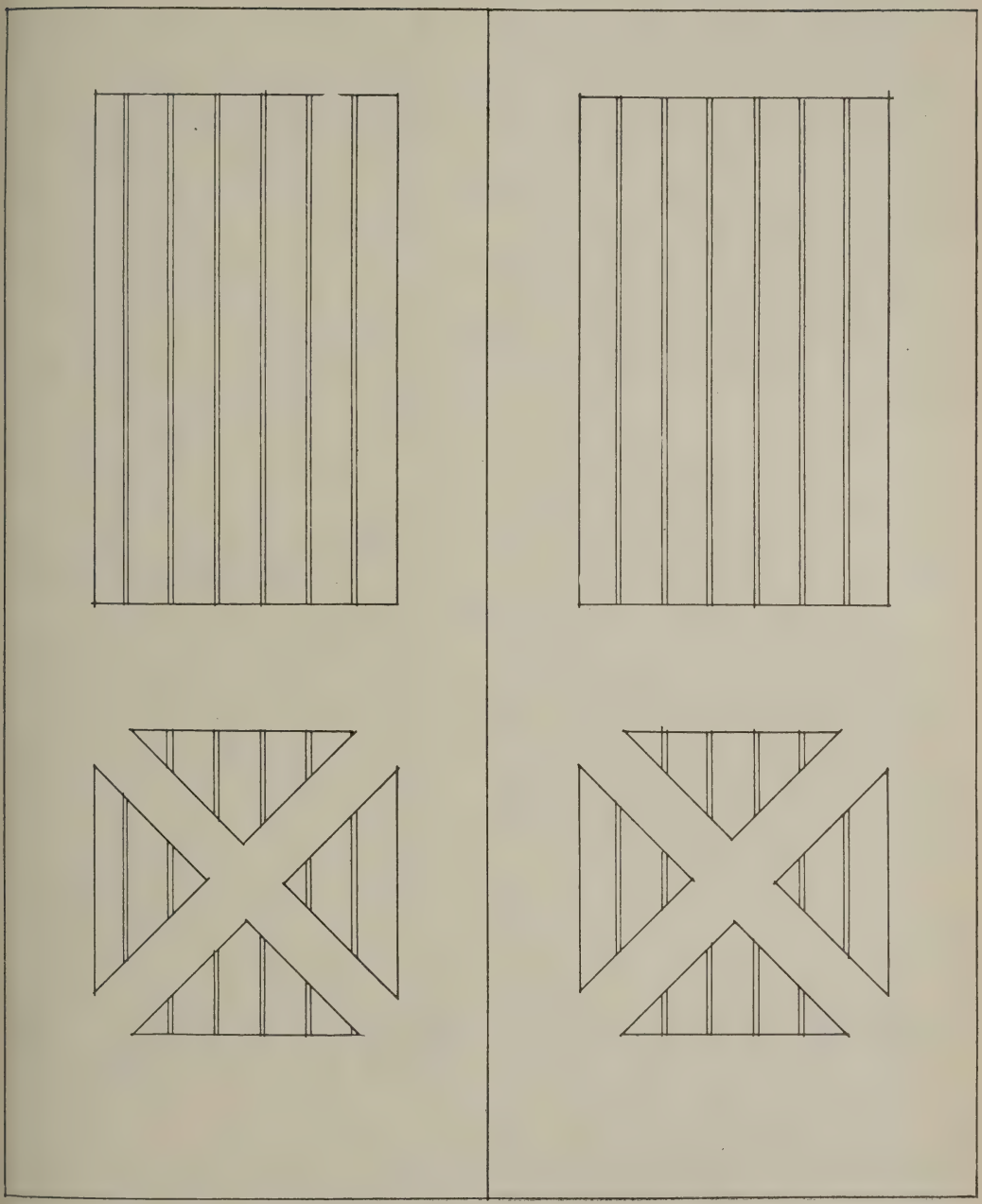


Fig. 8.

frame and the joint will have to be covered with some flat moulding like a half round.

Fig. 4 shows the frame of a 2¼ thick door made up with two frames of the same size, and the panel moulded in from both sides. Some factories glue the two pieces together and then mortise and tenon them the same as solid lumber. This is not a very good practice for such wear and exposure as the doors are liable to get in warehouse service, and even if the two thicknesses are screwed together after they are glued, they are liable to soak loose in bad weather and let up on the tenons so as to sag out of shape. Where they are framed up separately and then fastened together, they will stay up until they rot down through neglect.

Fig. 5 shows the section of stile 2¼ thick made up of one frame ¾ thick and two thicknesses of ceiling ¾ thick. The detail should be studied in connection with Fig. 6 which is a section of the upper part of the same stile, shown where there is a sash set in the frame. It will be seen that the middle member has a straight piece on the outside of the diagonal ceiling, and that in Fig. 6 this same piece reaches from the outside of the stile to the sash. This means that it is partly cut away where the ceiling laps over the outside frame, but is left full width where the sash comes. The reason for this is that it is not only tedious work to put diagonal ceiling on a stile 6 inches wide, but it makes a much better edge to the stiles to have the ends of the ceiling hidden.

Fig. 7 shows the elevation of a pair of these 3-ply doors with sash in the top part, and while it is not always true that these big doors hang in pairs, they do in a great many cases, and when they are paneled with diagonal ceiling, the ceiling should be placed so as to brace from the hinged side as well in the single doors as in the pairs.

Fig. 8 shows a door of similar character, having the braces cut in the frame and the ceiling put on straight. The braces are cut in after the ceiling is nailed on. If the doors are made in the shop it adds materially to their appearance to chamfer the corners of the braces and the stiles and rails around the panels. When the work is done by hand it does not pay to put on such extras unless they are specified.

When screwing the two or three members of these doors together, the workman should see that the different thicknesses are tight together before the screws are set through, for it sometimes happens that the threads of the screw will hold the members apart if they are not up at the start.

If these doors swing they should be fitted with an astragal for each pair, or the ceiling may be nailed or screwed on so as to form a rabbet.

Going back to Fig. 5 for a moment, we see that any two of the thicknesses shown will make an acceptable 2-ply door, and if the door is to be 1¾ thick, the members should be ⅞ thick. However, it is not often that the thickness of the door is arbitrary as long as the same party makes both the door and the frame. If the frame is rabetted for the door, the latter should be the same thickness as the rabbet in the frame, and may be off from the even fractions given here without decreasing its efficiency or value.

Roofing with the Steel Square—Combined Hip, Valley and Gable Roof Intersecting

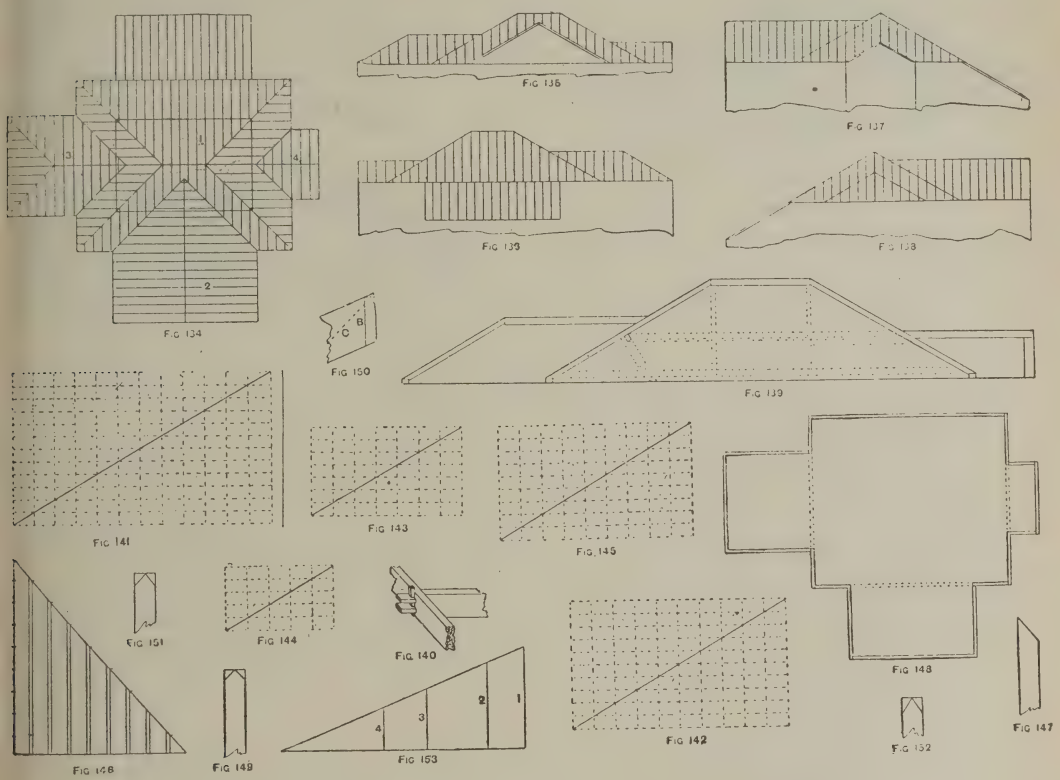
By J. H. B.

THE roof shown in the accompanying drawings and photographs is one which is often required at the present day to cover in the houses of the garden-suburb type which are so much in vogue. It is one in which the method of cutting by means of the square instead of putting up in position, marking and cutting each individual piece of timber, will be found to great advantage, owing to the number of pieces involved, and the consequent waste of time under the old method. This roof could be covered in with a valley roof proper, using valley rafters; but in the majority of cases it would not be seen on the inside, therefore, the use of sleeper boards instead of the valley rafters has been adopted. If the other way is preferred, the same principle governs the lengths

and angles of the various parts, and the roof would be equally as simple to do, though it would take longer in actual time.

Fig. 134 shows the plan of the complete roof, from which it can be seen that, strictly speaking, it consists of five complete roofs, three of them intersecting with the main roof, the other forming a lean-to continuation of the same. Fig. 135 shows the front elevation, Fig. 136 the back elevation, and Figs. 137 and 138 show the right and left elevations respectively. From these various elevations can be seen the hipped ends of the main and left-hand intersecting roofs, the gable ends of the front, the right intersecting roofs, and the lean-to at the back. The rectangular line in the main roof in Fig. 134 shows the position of the purlin.

The main part of this roof could be (and would be in many cases) framed up with collar-beam or king-post trusses, and if this were done, the position of the principal rafters would be as shown by dotted lines in Fig. 139. The middle rafter, which comes to the ridge in each of the hipped ends, would be framed as a half truss, the collar being keyed to the principal trusses, as shown in Fig. 140. If king-post trusses were used, the struts would, of course, go to the post on the three sides instead of two. The horizontal dotted lines in Fig. 139 show purlins and struts in an unframed roof, such as will be described.



The pitch of the whole of these roofs is 30 degrees, which gives a rise of 7 in. to the foot in width; thus the development of the main roof is as Fig. 141, the square being laid on to the 12-in. and the 7-in. lines, and advanced twelve times for the roof 24 ft. wide. The front gable roof is 20 ft. wide, and Fig. 142 shows the development, the square being advanced ten times as shown.

The left-hand hipped roof and the small gable roof on the right are 14 ft. and 10 ft. wide respectively. The developments are shown in Figs. 143 and 144, while the lean-to roof at the back is 9 ft. wide, and is shown in Fig. 145. The whole of the developments are for roofs with flush eaves, as shown in the drawings and photographs, and extra

lengths for projecting eaves must be allowed for, and will make the difference in the lengths only, not in the angles.

The development of one hip section is shown in Fig. 146, and from this is obtained the lengths of the short rafters, and the angle of the top cut, which will be found to

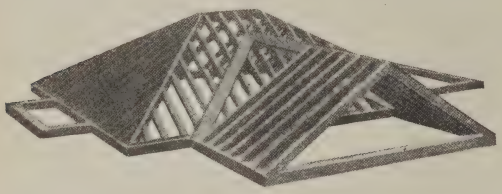


Fig. 154—View of Finished Roof.

come out at practically 50 degrees, as Fig. 147, or 9 in. on the square one way and 8 in. the other way. The down-cut, of course, will be twelve and seven, as in the top ends of the ordinary rafters.

Fig. 146 also shows how to obtain the length of the short rafters. The space from the middle rafter or the last ordinary rafter on the main roof to the extreme lower end of the hip is, in round numbers, 12 ft., and this is shown divided into nine spaces, which is somewhat wider than they should be in practice, but does for the sake of illustration. The ordinary rafters being 18 ft. long, it follows that each short rafter will be 2 ft. less in length than the preceding one, the longest one being 2 ft. less than the full-length rafters. This is the length of the short rafters at the shorter point of the top bevel. The remaining hips will be worked out for length in the same way. The angles will come the same, the roofs being the same pitch.

To revert back slightly, the wall plates would be continued all round in every way, as shown in Fig. 148, including the dotted lines, because for a roof built like this, sleeper boards would be used instead of valley rafters. If, however, it is intended to use the latter, then the wall plates would be framed as shown by the solid lines only, leaving a clear space through, and if this were not required, it would be folly to take the trouble to frame up with valley rafters. In a previous chapter it was mentioned that the top cuts of the hip rafter should come at right angles to each other when at right angles with the cut, but this does not seem to have been quite clear to some readers, so perhaps the following example will make it so. Fig. 149 shows the angle which the cuts would be if the top end of the hip rafter were

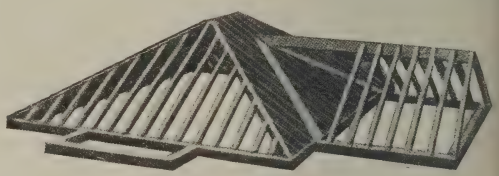


Fig. 155—Another View of Finished Roof.

cut off level, as dotted line A (Fig. 150), but as the hip rafter is fixed on the slope, as shown, instead of the cuts coming along the sides a distance equal to the length of the dotted line A, as they do in Fig. 149, they must come along far enough to equal the distance from the point of rafter to B, making the cut come as Fig. 151.

Perhaps it will seem more clear to suppose for the time being that the roof is much sharper in pitch, and that the angle of the hip rafter is as dotted line C in Fig. 150, which will bring the cuts as seen from the back of the rafter to the angles shown in Fig. 152.

In Fig. 153 is shown the development of all the hips and valley boards, as far as the length and angles are concerned, the numbers corresponding to those in Fig. 134. In the two photographs, Figs. 154 and 155, are shown the main roof finished and hips filled in, also the gable end roof No. 2 formed, and the sleeper boards fixed where this roof intersects the main roof.

Roofing Material for the Philippines

By ROBERT GRIMSHAW

IT SEEMS perhaps strange that American manufacturers should have to get a hint from German sources as to a probable market for fire-proofing roofing material—but, as a matter of fact, the following hint which should be of use to American manufacturers of roofing tin and zinc, and of other kinds of fire-proof roofing materials, comes from a report of the German Consul in Manila.

Most of the buildings in Manila, reports the official mentioned, and especially in the more thickly settled quarters inhabited by the poorer natives, are covered by roofs of dry nipa palm leaves. A slight spark suffices to set this material in a blaze. The fire then springs with great rapidity to the neighboring roofs, and in a very short time burns out whole streets.

Every year in the dry season—that is, in February and March—experience shows that fire breaks out in such quarters of the town as are especially favorable to the breaking out of a conflagration, and mostly in several places at once. Against this even the well-organized fire department is powerless; so that always a respectable number of homes is a prey to the flames.

There is no doubt that the breaking out of such damaging fires is due to incendiaries, who easily evade detection, as they need but a moment for carrying out their nefarious designs. It is generally assumed that these incendiaries are in collusion with the enterprising dealers in nipa palm leaves—this being so much the more probable from the fact that as a rule wagons loaded with these are at once on the spot where the flames had raged.

This Spring the number of such fires in the nipa district was especially great, without its being possible to catch a single offender. The city authorities of Manila therefore saw fit to enact an ordinance, April 1, to take effect at once, and according to which in future the use of nipa and similar light material shall be absolutely prohibited for new buildings, although they may to a certain extent be used on old ones.

A really suitable substitute for the light roofing material which is sentenced to gradual disappearance has, however, not yet been found; so that there is opportunity for those interested to step forward and make suggestions and offers. There is still remaining some of the fund which was offered as prizes for such a material.

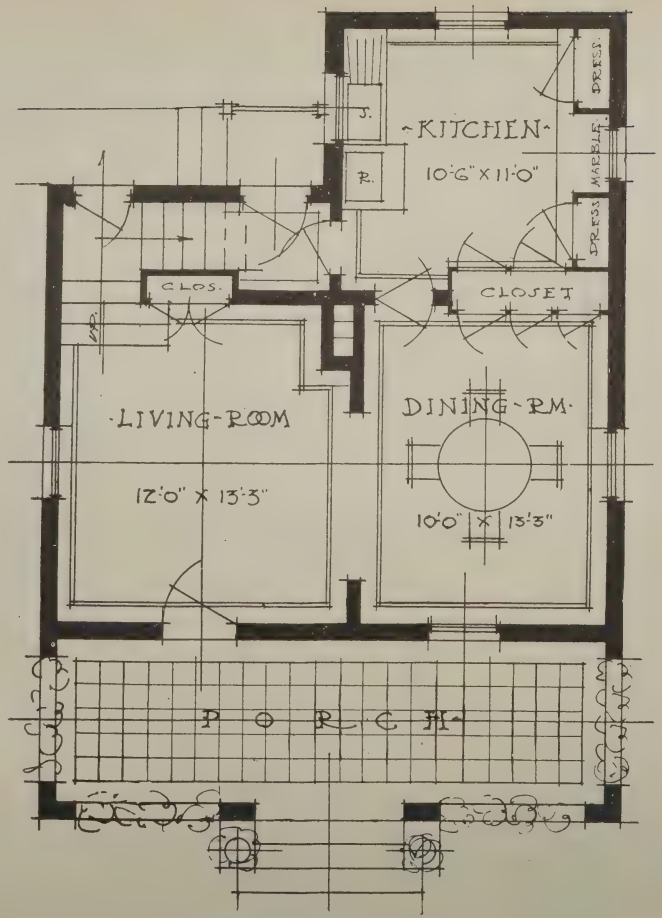
The Personal Appearance of the Small Contractor

By A. C. JONES

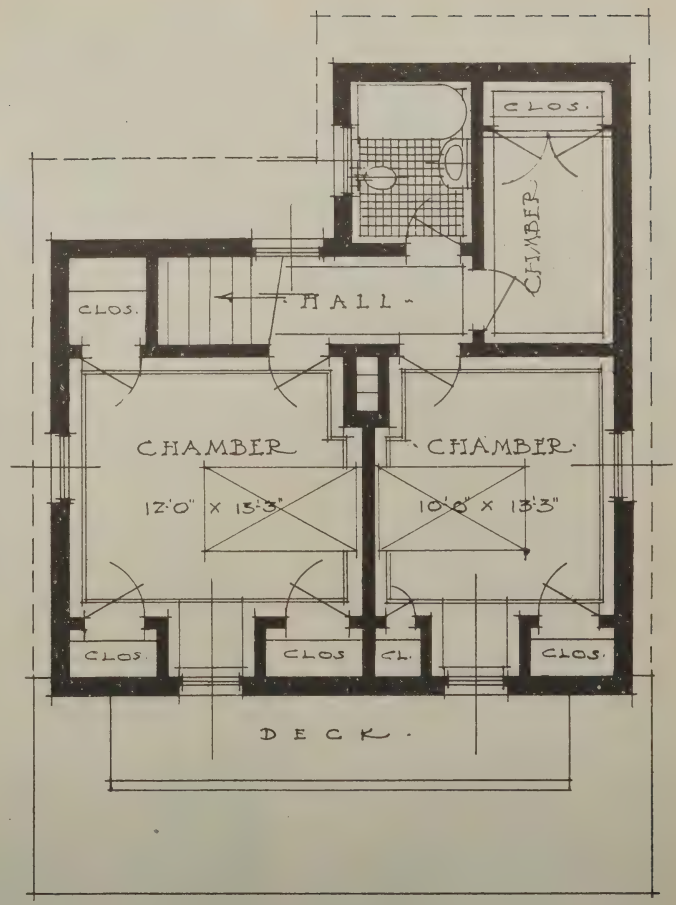
In answer to your competition, "The Personal Appearance of the Small Contractor," will say: First, I believe that locality has a great deal to do with his appearance. In this locality he must look better than the other workmen in order to be a contractor. He must dress neat on the street and other public places. If not, the people will say: "He don't look like he knows anything," and here a man that looks best gets the best. Now, on the other hand, a man that looks the same and works the same as his men has a chance to learn a great many things about his own job from people passing around. They will make remarks about the work that he would not hear if he did not look equal to the other men. This is a question that must be settled according to locality. A contractor coming here a stranger must look and be well dressed if he wants a contract.

Now, my opinion: Put your money in the job, put on your work clothes and work. If you are called across the street from your job to look at some work in a nice parlor (by a lady), go and don't take time to pull off your overalls; but when you go on the street, to the bank, etc., pull them off.

Conclusion: Look neat at all times, only when at work and on short notice.



FIRST-FLOOR-PLAN



SECOND-FLOOR-PLAN

M. D. Morrell, Architect. New York.

A Concrete Residence

By F. T. MESEKE.

THE accompanying cuts illustrated a good type of inexpensive concrete cottages designed and built by M. D. Morrill, Esq., at Virginia Highlands, located between Washington, D. C., and Arlington, Va.

Each house contains six (6) rooms and a bath, and the over-all dimensions are about 23 feet wide by 25 feet deep, exclusive of front porch, which is about 8 feet additional. There is a cellar under the main or front portion of the house, with a waterproof course of hot tar and felt bedded in the walls above grade.

The foundation walls are of poured concrete 9 inches in thickness. The outside walls above grade are 6 inches in thickness reinforced with ¼ inch or ⅜ inch iron bars above and below all doors and windows. The exterior is covered with a waterproof brush coating of white cement with waterproofed compound and earth colors.

The interior walls are plastered directly on the concrete with a brown sand finish.

All floors are of wood. The interior is finished in Virginia pine trim of craftsman design, stained a tobacco brown. Roofs are covered with cypress shingles.

The houses are wired for electric lights and also have furnaces and ranges for hot and cold water. The bath rooms are complete.

Such houses have been built for less than two thousand dollars ($2,000).

The New Era in Flooring

By J. CROW TAYLOR

IF YOU are a progressive builder and are only giving passing attention to the matter of flooring, you are overlooking an item that is of considerable more importance today than it was a few years ago. We are entering into a new era in flooring, an era of discriminating desire on the part of home owners that is calling for more quality and smaller units in flooring.

This is a matter that has been aired and urged more or less for several years now, but that all carpenters and builders have not given heed is evidenced by the criticism of an article urging more quality in flooring by a

carpenter correspondent of a building paper. Telling of some of his own experiences he says, "I started to lay a floor in a 20-flat building, when the foreman told me that a lot of floor was to be laid, and said: 'Don't nail every strip—just lay a lot of floor; that is all we care for.' Then they place a carpenter in the other room and you have to try to beat the other fellow or out you go. There is no question as to going on your knees and driving the nails home with your nail set."

When there is no question of going on your knees and driving nails home with a set, there is no quality in a floor. You can just put that down as a foregone conclusion. Also, there are contractors and contractors, and they differ in their requirements of men. Unless this man was simply laying a sub-floor to be finished over with something good, he was certainly turning out a mighty poor flat building.

The really modern flat building of today generally has fine floors, floors that not only require the use of the nail set, but are afterwards carefully scraped and finished, and quite generally in hardwood. It is hardwood that started the new era in flooring. It came in more thoroughly dried, carefully manufactured, with short, close fitting tongues, and in smaller units than the pine flooring. And while lots of credit is due the hardwoods themselves, and while they are still the material for the very highest class floors, the smaller units, the narrow strips had a lot to do with it. You can take narrow strips of almost any material, carefully manufactured, and make a good looking floor, one that is such an improvement on the old-time floor that there is hardly any comparison between them. This is really the big secret of good flooring, to use narrow strips so that there will not develop unsightly cracks at the joints.

The yellow pine manufacturers are recognizing this fact now, and some of them are beginning to feature very narrow flooring. One well-known concern has featured stock 1½ inches net width for more than a year now, and recently the writer came across a bundle of fresh samples from one of the biggest mills in the south ranging in net width, 1, 1½ and 2 inches, made in both flat and edge grain pine. Also it had the short, close fitting tongue that characterizes hardwood flooring, and when carefully laid makes a floor that one can be proud of.

That is what people want and will have these days, too, floors that they can be proud of, and the builder that fails to heed and cater to this want will soon find the best jobs and the ones that bring the most money and give the best satisfaction, getting away from him. It is a new era so far as flooring is concerned, and the wise carpenter or contractor should recognize this fact and make a study of the subject. Indeed, he may well make a hobby of flooring of quality, for there is nothing else that will appeal more strongly to the discriminating home builder these days.

There is a great variety of possibilities in flooring material. Oak is recognized as the real king of native flooring woods; maple has a strong hold on the favor of many, and the writer saw an entire floor of teak being shipped for a residence in Washington recently—thick teak in narrow units, resembling somewhat our thick, narrow stock in oak. The man getting this wanted it enough to pay a price for it that would stagger some people. Maybe you can make a guess at what it should cost to make and lay a residence floor in thick teak. It is something like ten times the cost of an ordinary floor.

This will serve to give some idea of the extremes to which people will go to get floors that they can be proud of, and from these extremes the scale runs back gradually to the plain floor. But today even the man that can only afford what we might call the plain flooring material likes to have a floor that he can take some pride in—not one of unsightly cracks that has been banged together with a hand axe and a disposition to lay a lot of floor rather than to lay a good one.

To get real quality in flooring, one should give heed to what is called the big secret above—the use of narrow units—but that is not the whole thing, by any means. The stock should be well manufactured from dry material, and it and the house should both be dry when it is laid, and, of course, it must be carefully laid and the nail set used.

Another thing that sooner or later the builder of quality must recognize and heed is that to lay a floor in a house before it is plastered, let the plasterers mess, and the

moisture swell the flooring, is rank abuse of good material. This will, perhaps, bring a note of derision from some, who will profess to be amused at the impracticability of the idea. But right now, while this is being written, the writer's feet are on a floor made of 1½-inch face thick common plain oak laid directly on the joists after the plastering was done. The floor is good, the joints are tight after a year of service, and one can take pride in it. Upstairs there is a contrast—a floor of 2½-inch pine laid before the plastering was done, that has unsightly cracks. So while it may seem amusing to some and be a little more trouble and expense to all to frame in cross walls and do the plastering ahead of the flooring, it is a thing we are coming to in many instances. Flooring is properly a part of the millwork and, except it is a sub-floor to be finished over with one of better quality afterward, the plastering should be done and dry before the flooring is laid.

To sum the matter up short, this is a day in which the floor is coming in for its proper share of attenton. The carpet is giving place to the rug quite extensively, and people want floors that they can be proud of. Also, they are likely to favor the builders that have a reputation for good floors.

Paint for Frames Covered by Masonry

By A. ASHMUN KELLY

WHEN panelling against a wall shows streaks in the finish, some time after the finishing by the wood finishers, it is pretty good evidence that there is dampness back of it, and this suggests the plan of always coating the back of any wood, frames or paneling that is to go against the masonry, for it is sure to be more or less damp there. Ordinary good metallic paint will do, but if hardened a little by the addition of some hard gum copal varnish it will be all the better for it. Use pure boiled linseed oil, if you can get it; most of it is simply bung-hole oil. See that the wood is perfectly dry before painting it, and allow the paint ample time for drying before placing the woodwork in place. For drying allow 24 hours to the coat, and two coats are much better protection than one coat. Use metallic paint, made from iron oxide ground very fine. Some of these oxides are, when in the dry powder, as fine as flour, while others are quite coarse, even gritty, and not at all suitable for painting woodwork. As iron paint is a poor self-drier, it will require some assistance from japan driers, enough to dry the paint hard in from 24 to 48 hours. Some prefer to use red lead for coating backs of frame, etc., but while no doubt somewhat better for the purpose than iron oxide, yet the latter will be found quite satisfactory. In any event, the backs ought to have at least one coat of some good paint before being placed in position. Even a coat of raw or boiled linseed oil will be better than nothing. Linseed oil, as it is generally known, is not a sure protection against water or dampness, being more or less affected by same, but to a certain extent it is a water-proofing substance, and if not subject to water or dampness too long at a time, will not be appreciably affected by it.

Instead of paint, the backs of frames, etc., might be coated with a varnish containing China wood oil, which has the property of rendering the varnish waterproof to a very great extent, and as there are now such varnishes on the market, it will be easy enough to procure them. The only objection to the employment of such a coating is the extra cost, the brown paint being very much cheaper. But there are cases where this extra cost would not be an objection.

This coating of the backs of woodwork against masonry is not often done, and when it is to be done, mention of it should be made in the specifications for the painter, and the kind of paint should be specified, with the number of coats desired. It is the same with the under parts of boards for flooring porches—a very desirable practice not frequently observed. A coat of iron paint in linseed oil on the under part of flooring will add to the length of life of a porch floor by a year or two, perhaps more, and this is as important as coating the wood that is to go against masonry. Such matters concern us only when it is desired to have the best possible work; on cheap work it is not to be considered, of course.

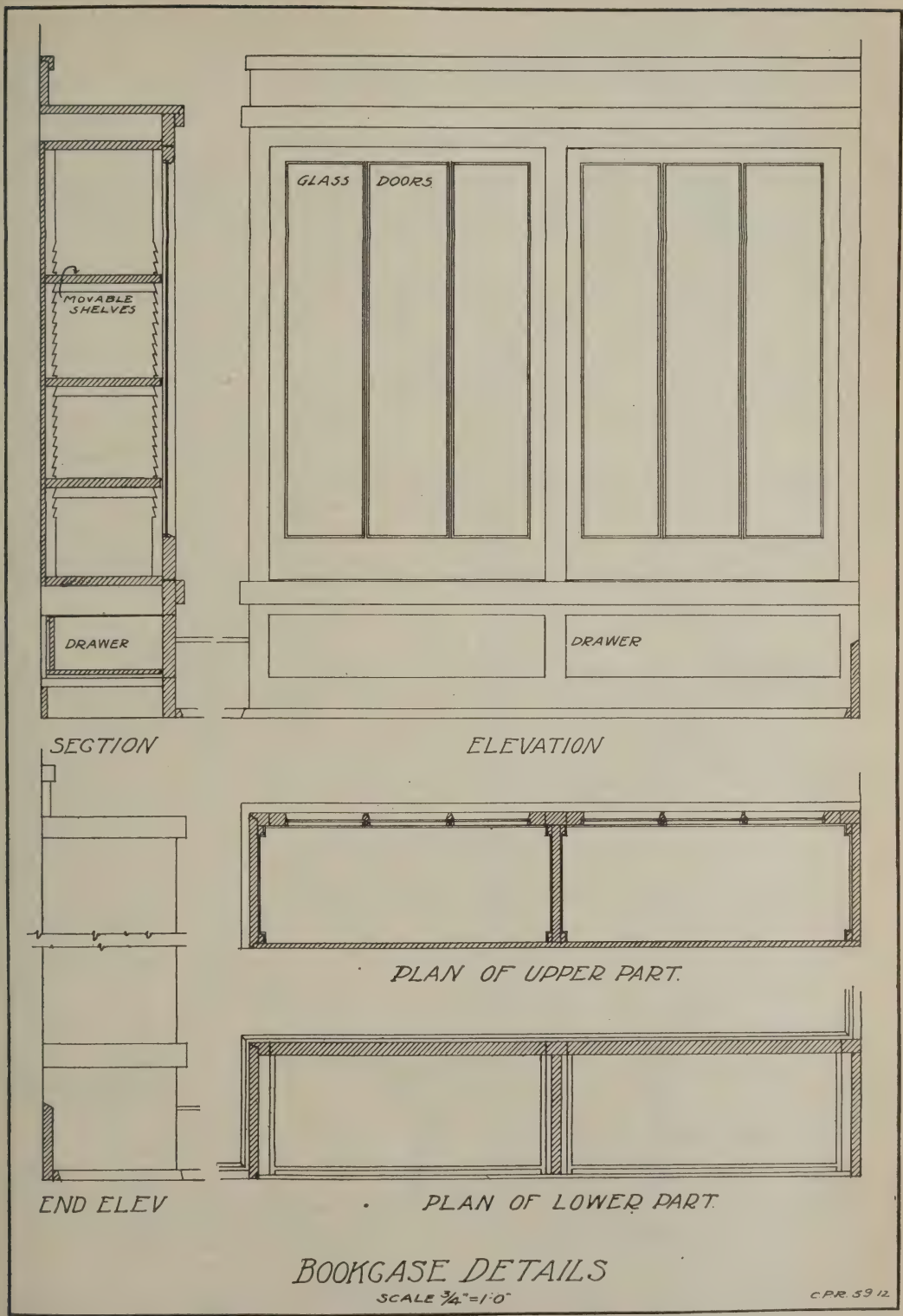
The Library and Its Fittings

By CHARLES P. RAWSON.

THE library is the one room in the house which distinctly and entirely belongs to the owner. It should be such a room as will enable him to pass pleasantly and with profit the hours at the close of the day. It must, therefore, be dignified and sedate and yet have coziness, warmth and seclusion. With this aim in view, dark colors should be used, as light colors and white do not give the warmth of tone required. Libraries may be roughly divided into two classes, formal and informal ones. By the former, I mean those rooms in which the walls are completely lined with bookcases, or nearly so, and which are usually modern prototypes of French or English rooms of the seventeenth and eighteenth centuries, simplified in form and decoration. By an informal library, I mean those rooms which in hundreds of American homes are used as a den or for living room purposes and which contain one or more low bookcases, perhaps on one or two sides of the room only. We show herewith simple details of bookcases typical of each kind of room as classified above. When the book shelves extend all the way around the room and clear to the ceiling, as in most formal libraries and as shown on two of the pages of details, it is well to hide the necessary projection of the shelves to hold the books by bringing the cornice or cove of the ceiling forward to the front line of the shelves. This gives the cases the appearance of being recessed in the walls instead of encroaching upon the floor space of the room. The detail shows how the doors, windows, etc., are made into one continuous and harmonious treatment. If the room contains a fireplace, the mantel also should be worked into this same design and, if possible, the room should contain a fireplace.

The other sheet of details shows the construction of a simple built-in bookcase. This will serve as a unit and may be extended to the length required for any particular case. The low shelves are supplied with doors while the high shelves are open. In all cases the shelves are made movable. All drawings are made to the scale of three-quarters of an inch equal to one foot.

In the decoration of a library, wall paper should never be used unless it is unavoidable. In rooms in which low cases are used which do not extend all around the same, the remaining space should be wainscoted in wood panels of the same height as the bookcase, if possible. If wood is too expensive, the base and cap of the case may be carried around the room and space between filled with matting or burlap with or without vertical strips. Use plenty of browns and yellows in the color scheme. If the room is lined with cases and there are not sufficient books to fill all the shelves, the vacant spaces should be filled with movable wood panels, stained the same color as the balance of the woodwork. As the library grows these can be removed, and it is always well to allow for growth.



BOOKCASE DETAILS

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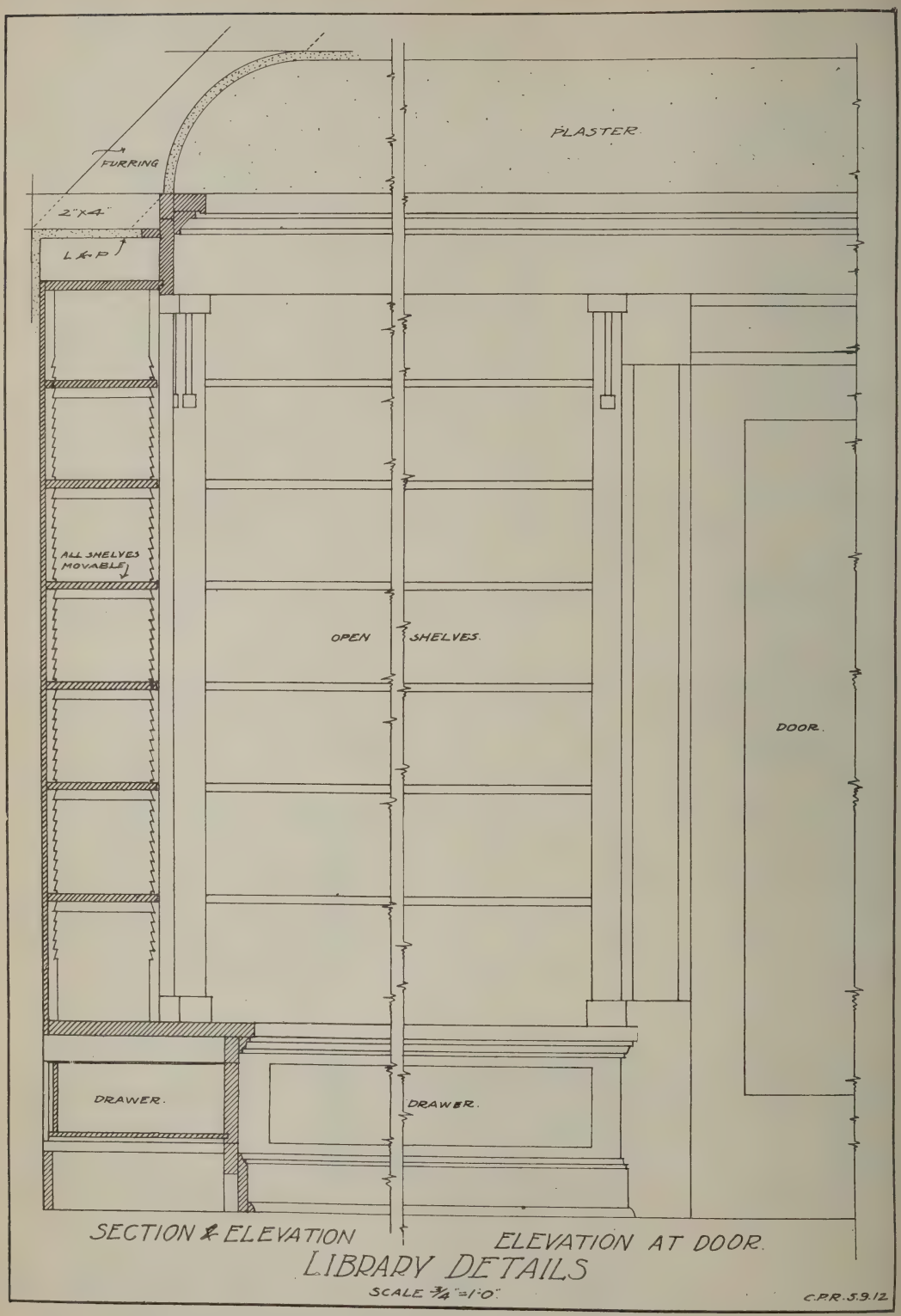
PLASTER
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ALL SHELVES MOVABLE
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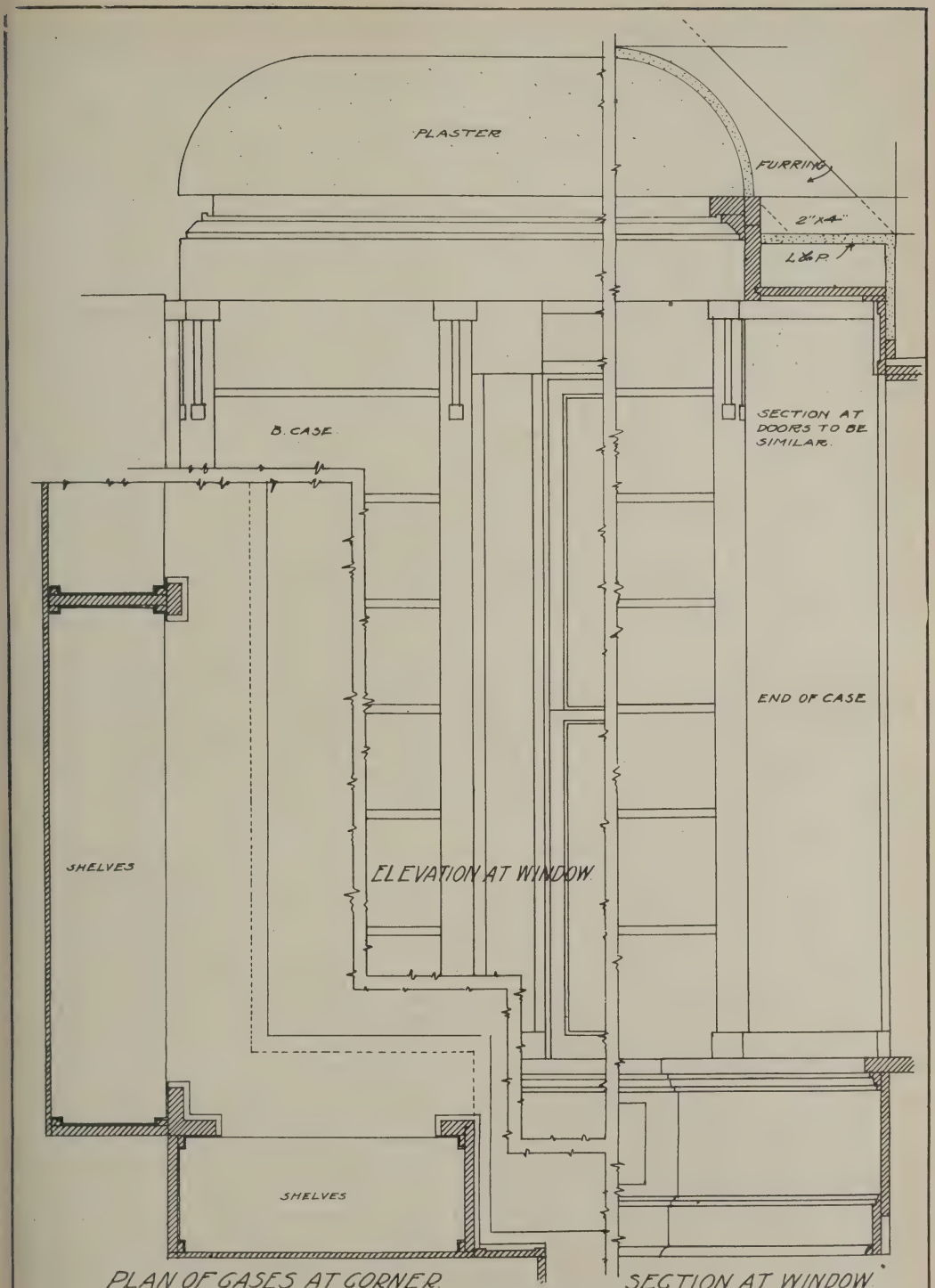


LIBRARY DETAILS.

SCALE 3/4" = 1'-0"

CPR. 5-9-12

Public Confidence—How to Win It Through Advertising and Otherwise

By IRWIN SPEAR

THE most valuable asset a contractor—or any man in any business—can have is the confidence of the public.

Confidence, or credit, to use a simpler word, is gained in two quarters, each of which is equally important. First there is the credit which a contractor has with those from whom he buys or borrows. Second, there is the credit among those to whom he sells.

A contractor secures bank credit or credit for materials not merely on the strength of a favorable statement of his resources and liabilities, but by his previous record and his known regard for a written or spoken promise.

Likewise credit with the people at large is secured by fair dealing. A man who has gained a reputation for doing as he agrees and for agreeing always to do what is right, need never lack backers or work. His reputation can be turned into cash—he can get money if he chooses to ask for it.

A specific illustration of the advertising value of keeping one's word was that of a contractor in a southern town who had sold a house with the understanding that a console should be added like that in another house which the purchaser had seen.

The console cost about $30 and the contractor finding that he could not get another exactly like it, installed a $40 one. The purchaser, who happened to be a lady, was so pleased that she never allowed an opportunity to pass for commending the generosity and squareness of this contractor.

In this way he obtained direct advertising that was worth far more than the $10 that it cost. Had this contractor made objection to installing the console in the first place or had he suggested installing a cheaper one, the purchaser would have felt she was being taken advantage of. Instead of becoming a booster she would have been indifferent, to say the least, and might even have been a knocker.

Many contractors fail to realize that there is an advertising value in keeping one's promise and in rendering little additional services that the customer may not even have expected. These things make satisfied customers—the best of all advertisements.

Make no promises to have jobs finished on a specified date unless you are mighty sure they will be completed. It is better to make the time more than you anticipate it will take rather than disappoint a customer. If he urges earlier completion, set the date earlier, with a proviso which will put all responsibility on him. Then if you make delivery before the specified time, you have pleased him. If you fail he has no comeback.

Very often impatient customers make demands that you can not, in justice to yourself, afford to concede. You will get more respect and a reputation for dependability if you never promise what you can not perform.

It is especially important that you make no statements in your advertising which you can not live up to. The era of exaggeration and superlative in advertising is passing. The more successful contractors stick to facts and state them conservatively, for they realize that facts can not be disputed and are therefore convincing.

If you want public confidence, beware, then, of "talking big" in your advertising. Don't blow about being the biggest and best. Be sincere. Heart to heart language, which always makes a hit in advertising of any kind, also breeds respect and confidence.

The harm resulting from advertising something and not delivering the goods is seen in the case of a large manufacturing concern that recently went into an extensive campaign of national publicity. Double page spreads were used in the Saturday Evening Post, pages in weeklies and monthlies of widest circulation. No less than $100,000 was spent. The copy was a product of genius. It made the goods advertised seem the supreme achievement of their kind and the only line worth consideration. It was what the advertising critics call "convincing stuff."

"What a grand success," everybody said. And for a time orders did come in by the bushel. In a year or so the business began to fall off. The advertising was still run-

ning and quite as brilliant as ever. But it did not get results. The public had found out that the advertising was too good for the product. It was a case of 125 per cent salesmanship.

There are few lines where permanent profits do not depend on repeat orders. Even in contracting, the man with whom you have dealt once is likely to do business with you again. If your advertising is such as to inspire expectations which you can not fulfill, it does you more harm than good.

The department store of the large cities is a good model to follow in winning public confidence. It is run on sound lines which the best business judgment has formulated and which time and experience have tested. So careful are these big stores about the trustworthiness of their statements in print, that should a price be wrongly published, the goods will still be sold "as advertised."

To get and hold confidence, the truth, the whole truth and nothing but the truth is essential in your advertising. This is important to remember because the average advertiser, especially where he prepares his own advertising, is apt to let his imagination run away with him. The result is a "spill" and a bruised reputation for the advertiser in nine cases out of ten. But the advertising is not the only place where public confidence is won or lost. Your employes exert a powerful influence for or against you in your efforts to gain good will.

The indifference and carelessness of some employes has been responsible for great losses to their employers in public confidence. On the other hand a force of employes always ready to speak a good word for the boss are one of the best advertisements of his character and one sure way to win confidence from outsiders.

Thus it will be seen that considerate treatment of those who work for you pays double dividends. You get more and better service and you get a loyalty and enthusiasm that works "after hours." Among friends and acquaintances and wherever they go your employes will spread a good report that will some day, some way, bear fruit.

No boss carpenter or contractor working even three men but can profitably exchange ideas and discuss ways and means to greater efficiency. Often the slowest men will surprise you by some good ideas. Every contractor owes it to his business and to himself to get the most out of his men and he can do it by getting close to them. It may seem a far cry from man building to confidence building, but you must remember that many people get their idea of you from those who work for you. If your employes speak well of you, it is fairly sure that people will believe it. And your employes will speak well of you if you interest yourself in them and show appreciation of their work.

If big concerns like the Borroughs Adding Machine Company, the Equitable Life Assurance Company, the National Cash Register Company, to mention only a few of scores that now train their employes—if these preeminently successful concerns find it profitable to maintain such schools, would not a vest pocket edition of the same idea prove proportionately valuable to you? The principle is the same in either case.

There is confidence-winning value in being what is called "a good mixer"—in knowing many people, in being seen where people gather, in belonging to social and fraternal organizations and attending their meetings.

Rubbing up against people, greeting them as though you were genuinely glad to see them, learning their peculiarities, humoring their whims—all these will make you popular and to be popular is usually equal to being believed in—to having public confidence.

The man who studies to please and who is always ready with the right approach, will find himself and his services in much greater demand than he who keeps aloof. To be known and seen is advertising and advertising, if it creates a favorable impression, inspires confidence.

Every house you build, every job you take, every customer you get may be made a means of increasing your stock of public credit.

Residence of W. A. Bradshaw.

E. G. W. Dietrich, Architect.

A $4,600 House

By E. G. W. DIETRICH, Architect

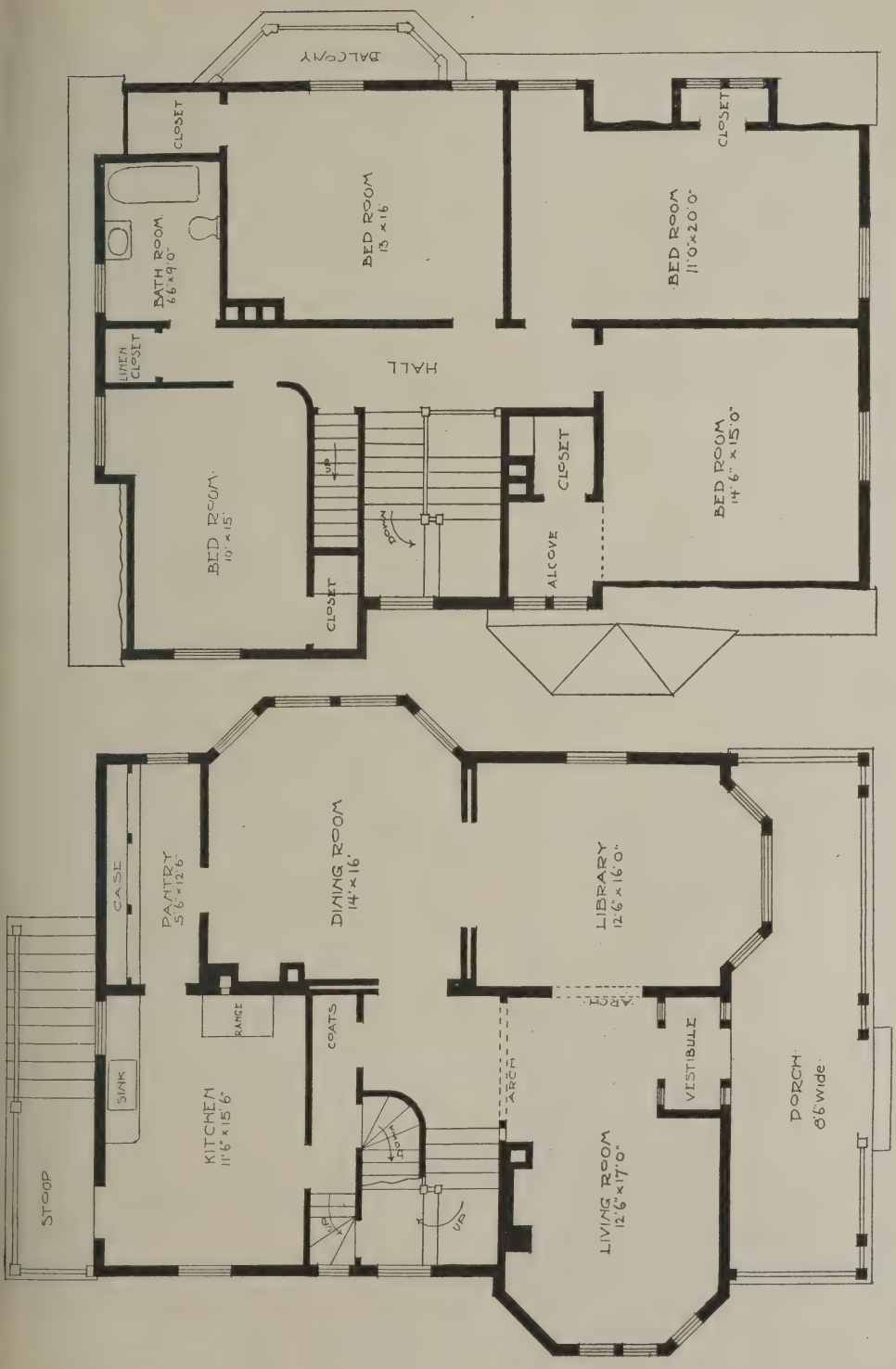
THE problem of the day which confronts every family is to keep within the bounds of one's means. To do so necessitates much thought on our way of living. The architect must contribute his share toward solving the problem. There being a larger demand for small, comfortable, well-built homes, normal in character but pleasing rather than offending the esthetic sense and affording what a man of sensitive taste can accept as a home. The architect must make a careful study of such in these more than in designing homes for the rich. With the limited means at his command his ingenuity is taxed to the utmost; every inch of space available throughout must be utilized in the development of his ideas that contribute to the successful planning of a useful and comfortable house.

The first thing to be considered (after the question of cost is determined) is the location as to exposure, compass points and the size of lot upon which the house is to be built. The house must not be placed too near the main road or street, nor can we afford to encroach on the kitchen garden at the rear. The exposure to be such as to get the greatest benefit in the main parts of the house at all hours, while one is asleep or awake. Such comfort is often overlooked in the planning of a small house, hence many failures and constant fault findings with defects that can never be remedied. Moreover, it must be so placed as to exhibit its own good points, without interfering or detracting from its neighbor. THE NATIONAL BUILDER has striven hard to guard its friends against the many failures recorded against the house builder, particularly those of moderate means and inexperienced in the many pitfalls that are sore experiences. Therefore, a successful small house of today is considered one of the most interesting problems in the architectural profession.

Every point of detail must be carefully weighed, to see that full value is received in obtaining the most in beauty and durability at the smallest possible expenditure, in order to meet the view and comfort of the housewife. To do so the architect must consider how to lessen the housework, by the saving of many steps of communication between rooms on the different floors. The large rooms with windows properly placed to get the best results of light during the day and obtaining good furniture space; all of which help in the solving of a successful scheme in the decorating and beautifying of the house.

In planning this house it was decided to adopt the Dutch colonial style of architecture, for various reasons. Although we have not got a reproduction, we have a house which belongs to the present day's small home in full accord with the best traditions of the old buildings, and yet accepting modern teaching in material, manner and disposition when these promise to add comfort and convenience. In the first place, it affords many advantages over any other style for a low cost house, where few rooms are required on the first floor. Then, again, the foundation can be kept down in size, while on the second floor more bedrooms, closets, etc., and larger ones can be acquired by extending over the porches, etc., than from any other style of architecture. Then on the exterior a more picturesque result is to be had at a less cost than from other styles, as is shown in this most successful example, with long, low, horizontal lines and the simple yet artistic effects. Quaint little touches of detail are shown, which add to the beauty without increasing the cost of the structure. The entire absence of ornaments of any kind and the solidity of the exterior attracts one's attention and admiration as a house beautiful in its simplicity.

The architects during the middle of the nineteenth century knew and cared as little for the subtle effects derived from the right choice and manipulation of material as did the bulk of their clients. The instinct of the craftsman for color and texture withered from neglect, but it has not entirely perished. That under the proper culture it rapidly revived is proven by the results obtained at the cottage we are studying. It is a little flower of the field amid the great crop of artificial growths that environ it. And this we have come to recognize. We see that there is something in it that the very simple means, good and unpretentious by which the right effect has been produced and


BALCONY
CLOSET
BATH ROOM 6'6"x9'0"
BED ROOM 13'x16'
BED ROOM 11'0"x20'0"
CLOSET
LINEN CLOSET
HALL
BED ROOM 10'x15'
UP
CLOSET
ROOM
CLOSET
ALCOVE
BED ROOM 14'6"x15'0"
SECOND FLOOR PLAN
CASE
PANTRY 5'6"x12'6"
DINING ROOM 14'x16'
LIBRARY 12'6"x16'0"
RANGE
COATS
SINK
KITCHEN 11'6"x15'6"
ARCH
VESTIBULE
PORCH 6'6 Wide
STOOP
LIVING ROOM 12'6"x17'0"
DOWN
UP
FIRST FLOOR PLAN

a character given to this dwelling, which nothing near it shares, is perhaps a thing which should be aimed at. A seed has been sown which may germinate and wax great.

The exterior is covered with shingles, stained a chestnut brown for the side walls, the roof shingles are stained an olive green. All the trim is painted white. The porch ceiling is in broad panels made of wall board; this material is particularly adapted to porch ceilings on account of its great width, which reduces the cost considerable in material and labor over the old narrow ceiling boards; besides, it gives an effect of great expense, the panels being about four feet square, painted white to reflect a light effect in the library, etc.

If, then, the result pleases it is not from expensiveness or elaboration. It is just because it is meet, because the sense of scale has been thoroughly preserved. Every material is allowed to be itself, and all seem to belong to the same family. A single mode of expression has been used throughout, and it is not a grand one, it is entirely wholesome. It says that poor and content is rich and rich enough, and it spreads around it its self-evident contentment with its own lot in life. If fills you with the same feeling and convinces you then and there that it is enunciated a reasonable doctrine. Marble halls and gilded saloons are right enough when possessors and denizens are able and willing to do them justice and live up to them. But playing at them with cheap scenic imitations is neither comfortable for the body nor wholesome for the soul, while little vulgar efforts at introducing a semblance of some of their qualities in the jerry-built villa are sheer depravity, and depravity of the thoroughly reprehensible type that is stupid and ugly. Any phrase of life that is honest, sufficiently and intelligently carried out is interesting and worthy, while its material manifestation in the shape of the house built, fitted and furnished in harmony with it, becomes, in competent hands, a work of art. This is true of the humble effects here presented, which makes no pretence of representing exigenous forms of existence. It is spacious, convenient and well fitted, but at the same time its simplicity and straightforwardness encourage perfectly natural conduct.

The entrance from the front porch into a fair-sized vestibule leads one into a generous sized living room, with a large open fireplace of old gold colored bricks, back of which rises the main stairway (broad and easy to ascend), with a broad platform midway to rest and add charm to the constructive feature. The hall is finished in natural white wood, which in time will take a beautiful old golden color.

To the right you enter a room used as a library, this room is also trimmed in white wood stained a light brown. And back of this room is the diming room finished in white paint. The tile facing of the fireplace is in Delft blues. Connecting with the dining room and kitchen is a pantry of good size. Pantry and kitchen are Cypress finished natural. The kitchen has a wainscoting of wall board lumber four feet high, it being of such size that it can be put up without any joints, which being waterproof and vermin proof, makes it a very sanitary wainscoting.

The living room, library and dining room are separated from each other and connected by wide openings.

The same finish as in the first story hall is carried through the hall in the second floor, while the bed and bath rooms are painted white. The bathroom has a wainscot five feet high of the same material as in the kitchen wainscot, excepting that it is finished in white enamel with a surface like polished glass.

The attic contains a good room for a servant and a store room for trunks, etc.

The cellar extends under the entire house, and is subdivided into furnace, coal, wood and vegetable cellar, also a good-sized laundry on a level with the rear yard.

The whole house is wired for electric lighting and piped for gas, hot and cold water.

The house has been built complete as follows:

Excavation and foundation	$ 510.00
Brickwork and plastering	700.00
Lumber, carpenter work and painting	2,715.00
Plumbing and range	395.00
Heating	180.00
Wiring	50.00
Gas and electric light fixtures	60.00
Total	$4,610.00

The Specification of Window Glass

By EDGAR H. BOSTOCK, in American Architect

ARCHITECTS nowadays cannot be experts in all materials specified, but they must possess sufficiently accurate knowledge of them to be able to recognize difference in kind and degree and to choose intelligently that grade which is appropriate and economical for the purpose in hand. If a special problem of material arises the disinterested expert must, of course, be consulted, but it is for the ordinary problems of architectural practice that architects should be better acquainted with the properties of some of the materials they have constantly to employ in their buildings. Of these window glass is especially important, because it has been neglected in the architects' specifications and is often mentioned in vague and ill-considered terms. The two prime difficulties in securing the installation of suitable window glass are the failure of the architect to acquaint himself with the requirements the glass must meet and the ease with which the dealer can substitute an inferior grade. Low-quality glass, though not hard to detect, is extremely hard to prove, except by an expert, who is not apt to be called to decide except in cases of special importance.

The ordinary jobber's stock of American window glass consists of about 75 per cent "B" quality and 25 per cent "A," and of about the same proportions in single and double thickness. The usual building specifications fall within these limits.

The only choice in thickness in American window glass is between American single, which averages one-tenth of an inch in thickness, weighs about 20 ounces per square foot and is safe to use against ordinary wind pressures in sizes up to 28x34 inches, and double strength glass, about one-seventh inch thick, requiring a counterbalance of 26 ounces to the square foot, and procurable up to sizes whose sum makes 120 inches; that is, 60x60 inches, 40x80 inches, or anything within these limits. It is hardly safe to use double strength window glass above 40x44 inches in exposed situations or in movable sash. If it is desired to economize on the cost of plate glass in a front, the larger sizes of double strength window glass may be used, but only in stationary lights and in protected situations.

The difference in cost between "A" and "B" qualities throughout the lists will be found to average about 10 per cent, for ordinary sizes in single thickness with more in the larger sizes and for double thickness. It is allowable for "B" quality to contain, in a minor degree, some of the lesser faults incident to its manufacture, i. e., "cords" or "strings," small blisters either from melting or caused by the workmanship, small burnt patches; that is, where carbon from the gas flame of the flattening oven has adhered to the sheet. It should never be passed if any of these defects are too pronounced, nor if the sheet contains stone, surface cords, furnace scratches, pipe blisters, or is improperly flattened; nor, if as sometimes happens, small broken pieces of glass have become attached to the surface. These fragments usually refuse to come off, and, besides their unsightliness, are a source of danger to the cleaner.

In buildings where clear lighting is of no great importance, the "C" quality or "O. B." machine brand, will save one cent a square foot, but the buyer must be prepared to pass any defects in glass except "stones." By this is meant pieces of foreign matter, clay from pots and tanks of material not thoroughly crushed; such blemishes are not permissible, because under stress and unequal weither conditions they are almost sure to crack the sheet and necessitate replacement. For ordinary mill, warehouse and cheaper household construction "B" quality is usually specified, keeping in mind that the smaller the size the less the price for the glass, though not, of course, for the sash construction.

The ordinary "A" glass of commerce is the highest quality the factory produces above "B," very little selecting being done above the former. If "AA" is ordered from a jobber, he will open a few boxes of "A" and select therefrom such sheets as he thinks will pass inspection. In "A" glass no cords of any kind should be passed, no stones, no gatherer's blisters except the occasional small

"blib" caused by the melting or very fine dust blisters, nor any glass that is wavy enough to distort vision.

In specifying any quality and thickness of American glass it is well to require a tank-made, hand-blown, natural-gas and dipped brand.

Hand-blown glass is to be preferred to machine-drawn, because of its greater reliability in withstanding the strain due to changes of temperature. Machine-drawn glass cylinders were first made by one John Lubbers of Pittsburg in 1895, and though, at first, very inferior in quality, have recently been much improved. They are not desirable, however, when a thoroughly reliable product is called for. Tank-made glass is to be preferred to that melted in pots, inasmuch as it is made with a salt-cake base and not liable, like the pot-melted, to fade in the course of time. Dipped glass means that the sheets, hot from the lehr, are dipped in hot water and acid, removing from them all traces of sulphur stain. Glass made with natural gas is to be preferred, because it carries no excess of carbon, it is not likely to be burnt; that is, have the small particles of unburnt carbon adhere to the surface of the sheet.

The next step in quality from American glass is the so-called French, which is usually Belgian-made, and runs fully 25 per cent better than corresponding American quailties, though it is lighter in weight than the corresponding grade of the American, the single being usually about one-tenth inch thick and weighing 17 ounces to the square foot, the double about one-eighth inch thick and weighing 21 ounces. In small sizes up to 10x15 inches the French glass usually sells in New York at the same price as the American and the difference is not very great up to 16x24 inches. Above this, freight charges, breakage and tariff make a difference of four or five cents per square foot.

If the very best blown glass is desired, the English must be specified. This is rated by weights per ounce to the square foot and the 21 and 26-ounce qualities are most frequently used. English glass may be readily mistaken for plate glass, as it contains almost no waves and no defects except an occasional very small blister. In moderate-sized sheets it is generally about 20 cents per square foot.

To the layman it might seem an easy matter to substitute American glass where the foreign has been called for, substituting the best qualities to escape discovery. Such substitution the expert can almost invariably detect. In fact experts who have made a specialty of inspection are able to distinguish blindfolded the difference between American and English glass by merely listening to the "sing" and "feel" of the diamond in cutting the sheet. The English, being better tempered glass, cuts softer.

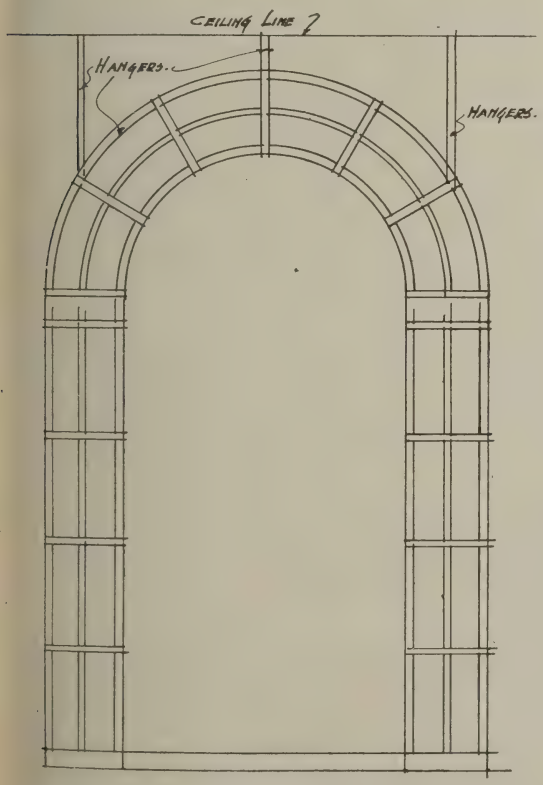
As to plate glass there is little to say. American glazing-quality plate being the usual specification. If a better grade is desired, "silvering" quality may be called for, and if the best, "French silvering," this last being as near perfect a glass as is produced commercially. It is almost silver white, whereas American plate is usually a little green in color. It is procurable any size and thickness for special purposes; the usual glazing thickness is about one-fourth of an inch and weighs three and one-half pounds per square foot. The only defects apt to be found in plate glass are bubbles and occasionally a gray spot where the polishing is not perfect. An excess of any of these imperfections is sufficient cause for rejection.

Iron Furring and Metal Lathing

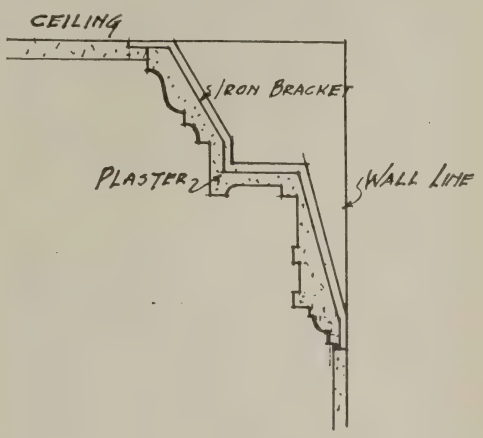
By DAVID MACKAY

IN CONFORMANCE with the great changes which have entered into the construction of modern buildings, a suitable system of furring and lathing had to be evolved. Practical utility, strength, durability and resistance to fire being the aim of modern builders, it followed that any such system must embody these qualities. Iron, having revolutionized construction by its distribution of weight and strains and proved its usefulness in one branch of building, was naturally tried in this. So we have the rise of iron furring and lathing which has solved many of our present day problems in construction, especially in the combination of iron and cement.

Iron furring has long passed the experimental stage and its use is increasing day



by day. Not alone has it displaced wood construction in the building, such as brackets, etc., but it has also displaced block or brick partitions, recommending itself by its lightness, cheapness and saving of space. What is known as a "two inch" partition



is now used in many buildings where such qualities are needed and where a form of semi-fireproof construction is desired.

In producing iron furring no elaborate machinery is necessary. A punching machine, bender and cutter is all that is needed, and when we look at the elaborate designs carried out by the use of these three machines, combined, of course, with the mechanical ability of their users, we must acknowledge that the latter has brought his trade abreast of, if not farther, than any other in the building line.

The first use, that the writer has knowledge of, to which iron furring was put was as brackets for plaster cornices. It was found by bitter experience that wood soon decayed and when used to carry heavy designs, became a danger to life. Wood having proved its non-suitability, the use of iron furring naturally followed and although the principle of design was along the same lines, the work naturally went to the iron worker or lather.

The method of constructing brackets is as follows: The full sized detail of the cornice or beam is taken and a uniform allowance of one inch is made for wire and plaster, resulting in an outline such as is

shown in the section of bracketed cornice.

This is a simple form of the outline merely showing the method of construction. In other forms, such as arches, penetrations, groins and domes, a more complicated construction is used, but the principle is the same; the only difference being that a system of bracing is introduced. Lateral pieces of iron are bolted on to strengthen and stiffen.

The form of bolting is the punching of holes in the bracket and the securing of the necessary braces with screw and nut. This method is used throughout in this work, no riveting being necessary. Figure 2 is an example.

In furring partitions, the method varies according to conditions. The iron strips are generally bent at both ends so as to project at right angles for about four inches and thus form a means of securing to the floor and ceiling. A brace is usually run through the middle to stiffen, being tied with wire to the uprights. In this form of construction, only one side of the partition is wired, the material, which is gauged, going through the wire lath and almost bringing the opposite side flush with the uprights. All, then, that remains to be done is to give it a cast of browning. This is known as a "two inch" partition.

After the introduction of iron furring, metal lath naturally followed. The first form of metal lath was what is known as wire cloth. This is usually of uniform ⅜-inch mesh and is largely used for mouldings where a uniform outline has to be observed. Owing to its adaptability to form, it is the best for this purpose. Too much attention cannot be given to the lathing of a building, for the most beautiful design becomes a menace when carried upon poor ground work. On account of its lasting qualities, galvanized wire cloth should be insisted upon. I personally inspected a piece of galvanized wire cloth which came out of the Grand Central Station in New York City after being embedded in plaster twelve years, and it was in as good condition as the day it was put on.

Many forms of metal lath are on the market, some relying upon their cheapness to recommend them. But a worse investment never was made than to put poor metal lath in a building. What is known as expanded metal is best, both for its substance and design. It is formed of soft sheet perforated and shaped in such a manner that the plaster "keys" on the same to such an extent as to overlap and bind together, making it impossible for plaster to fall. Some of the metal laths in the market are a distinct detriment to the plasterer, discrediting his trade through their flimsiness and liability to decay. Some are merely sheet iron with a few holes punched at regular intervals, but leaving entirely too much plain surface and too small a key. Good wire cloth and expanded metal, if properly "tied," makes a splendid surface for plaster. While at the beginning it is a little more costly, yet with their stability and lasting quality, they more than make up the difference in the end.

Poor lath and poor lathing is a curse to contractor and owner alike, for there is only one way to rectify the condition it creates—that is to tear down and replace, and this is always costly and inconvenient.

System for the Contractor

By WM. C. A. STEVENSON

THERE is probably nothing that causes the contractor more annoyance than to work out some system to keep account of each different job, so as to be able when the job is complete to know whether he has made money on the job or gone behind.

The writer has found this a very difficult problem, inasmuch as his business is largely jobbing trade, which necessarily scatters his work more than on large jobs. When you have your men centered on one job there is not much trouble in keeping account of them, the time book and your material bills will about do it.

The jobbing carpenter is up against a much more complex problem. It requires some system that will keep the account with the least amount of clerical work.

I am showing herewith a time sheet and job order which I have found to about cover

the bill. When I start a man on a job I simply fill out one of these, giving the customer's name and location of the job with the instructions fully written what is to be done. When he has finished the job he turns in the sheet properly filled in showing from doing work other than what the job calls for, as many times customers will endeavor to have the workman do work for which they do not want to pay for and which has not been agreed upon to be done. Most workmen are not firm enough to refuse, but,

WM. C. A. STEVENSON CARPENTER CONTRACTOR 38 SO. ALBANY AVE.

WORKMAN TIME SHEET AND JOB ORDER

Workman ..... Occupation .....

Time for week ending Friday 191

Instructions for job located at ..... St. or Ave.

For .....

.....

.....

For additional Instructions, see back

NOTICE—No time allowed for work done contrary to instructions, be particular to keep time separate on every job.

Time on	Time off	Day	Hours	MATERIAL USED OR REMARKS
		Sat.		
		Sun.		
		Mon.		
		Tues.		
		Wed.		
		Thurs.		
		Fri.		

Workman Signature .....

his time daily, time on and time off and also any materials he may have taken to the job himself (all materials delivered to the job for which I would have bills are not placed on the sheet). He does not put the time for two different jobs on one sheet, unless it is time work for the same customer. Of course, when the job lasts over the week end he turns in the sheet for that week and gets a new one for the next week and so on.

In order to ascertain the cost on any job all that is necessary to do is tally up the sheets for that job together with the material bills, etc., and you have it. These can be filed away for future reference. The "Notice" on the sheet prevents the workman when they know that no time will be allowed for work so done they will not be so willing to do it. In order to refuse without causing any friction with the customer he can just show them his instructions and tell them it will be necessary for him to have the order to do it.

Then, again, the space for time on and time off will settle many a dispute over the time put in on jobs as it shows precisely the time started and stopping on each day, over the workman's signature.

I trust this will prove of some service to many fellow readers who have experienced the same troubles.

Brick Veneer

By WALTER C. HARVEY

A BRICK VENEER house has some advantages and many disadvantages. Among the first are—that it can be constructed more cheaply than one of solid brick; that an air space is provided between the brick and the sheeting, thus making the building cooler in summer and warmer in winter; that a protection is afforded against fire from adjoining buildings; that painting is not a necessity, and its appearance makes it look well to an investor, especially one who is not familiar with building construction.

A new building, brick veneer, is satisfactory in many ways. As provision is generally made to support the weight of the walls, the window frames are made one inch wider to allow for the air space, heavier sheeting is used, and there is good opportunity to apply easily and quickly the metal ties or clips that ought to be used every fifth course to tie the brick work to the sheeting, and there is no excuse for the courses not to be level and the corners plumb.

Among the disadvantages of brick veneer are: It is deceptive; it does not support any of the constructional parts of the building; it does not afford any protection from an interior fire and the cost of repairing any such damage would be materially increased. Veneering an old frame house is generally an unsatisfactory job for many reasons. At the time of erection no provision was made to carry the extra weight, as in a frame building the weather boarding and framing is carried to the outside of the basement or cellar walls. Then the building has settled in parts and angles and corners are out of plumb, and the bricklayer has his own troubles. He is also forced to nail his clips to the sheeting, and as this is an awkward job for him the number used is liable to be greatly reduced. If a stone window sill is used, the weight is too much for a single brick course, and the result is either a cracked sill or a badly settled one. Then the cutting out of the old sill and sub-sill and making a good job require considerable time on the part of a carpenter, and in a majority of cases the results are not satisfactory.

If the walls or corners are more than an inch out of plumb, it is almost impossible to remedy the trouble even by dispensing with the air space. I have found that after ten years, rust has eaten away all the metal clips that tied the brick work to the walls and an attempt to plug or cut the veneer wall resulted in driving in an area of from one to three feet flat against the sheeting and the wall had the appearance of collapsing. Again, I have seen an attempt made to cut into the veneer to support the joists of a front porch, with the result that the whole front slipped to the ground.

I would never advise a man to buy a brick veneer house, either as an investment or a home, but in many cases would advise him to buy an old frame house and plaster the outside, and he would have a cheaper and better job and there would be no attempt to represent anything but what it really was.

As briefly as possible, I have endeavored to make clear what has been the results of observation and practice of twenty-five years in the building trades, and I leave the matter with my readers, assuring them that I am not too old to learn or to be convinced when good reasons are given.

Proportions and Quantities in Concrete Work

By JOHN UPTON

IN ESTIMATING the cost of concrete construction, we must consider the labor cost and also the quality and quantity of concrete required. For different kinds of work we should use different mixtures, and while the exact proportions to be used will depend somewhat on the quality of the material used, the following table will be of value to many.

The richest mixture which will commonly

be required is called a 1-2-4 that is, one part cement, two parts sand and four parts of loose gravel or crushed stone. As a distinction between gravel and sand it may be assumed that sand will pass through a one-fourth or three-eights inch screen and gravel will not.

A 1-2-4 mixture is suitable for reinforced construction such as floors, beams, columns, tanks, silos, fence posts or culverts. It can be made water proof and air tight.

With this proportion one barrel of cement will require seven and one-half cubic feet of sand and fifteen cubic feet of gravel and will make seventeen cubic feet of concrete.

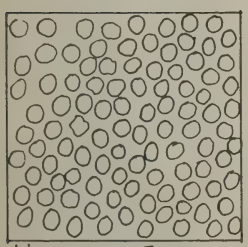
For a medium mixture for making thin foundation walls, ordinary floors, walks, etc., 1-2½-5 will give good results. This will require for each barrel of cement 9½ cubic feet of sand and 19 cubic feet of gravel and will make about 21 cubic feet of concrete.

At first thought it might seem that the amount of concrete would be equal to the sum of the amount of the ingredients used, but this is not so, for the cement only fills the voids in the stone, with a slight excess, perhaps ten per cent of cement, so the 19 cubic feet of gravel will be increased to 21 cubic feet of concrete.

For heavy walls, piers and abutments we may use 1-3-6 concrete. For each barrel of cement allow 1½ cubic feet sand and twice as much gravel. The resulting concrete will be almost 24 cubic feet.

A leaner mixture will do for some classes of work, as large foundations or backings for stone walls. A 1-4-8 mixture will give some 35 cubic feet of concrete to a barrel of cement.

It should be remembered that if the gravel or stone is nearly uniform in size, the resulting concrete from mixing a given quantity will not be as great as it would if the stones were of varying sizes for there will be more space or voids in the coarse material and so more fine material will be required to fill them. See Figs. 1 and 2.

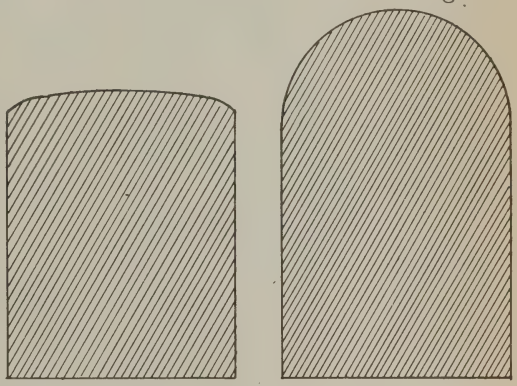


UNIFORM SIZE OF STONE

FIG 1

VARYING SIZE OF STONE

FIG 2



RESULTING CONCRETE

The conditions or rather the materials may vary so much that it is not easy to tell the exact amount of materials that will be required for a cubic yard of concrete but the following figures will cover most all cases and generally the average of the numbers may be taken:

MATERIALS FOR ONE CUBIC YARD OF CONCRETE.

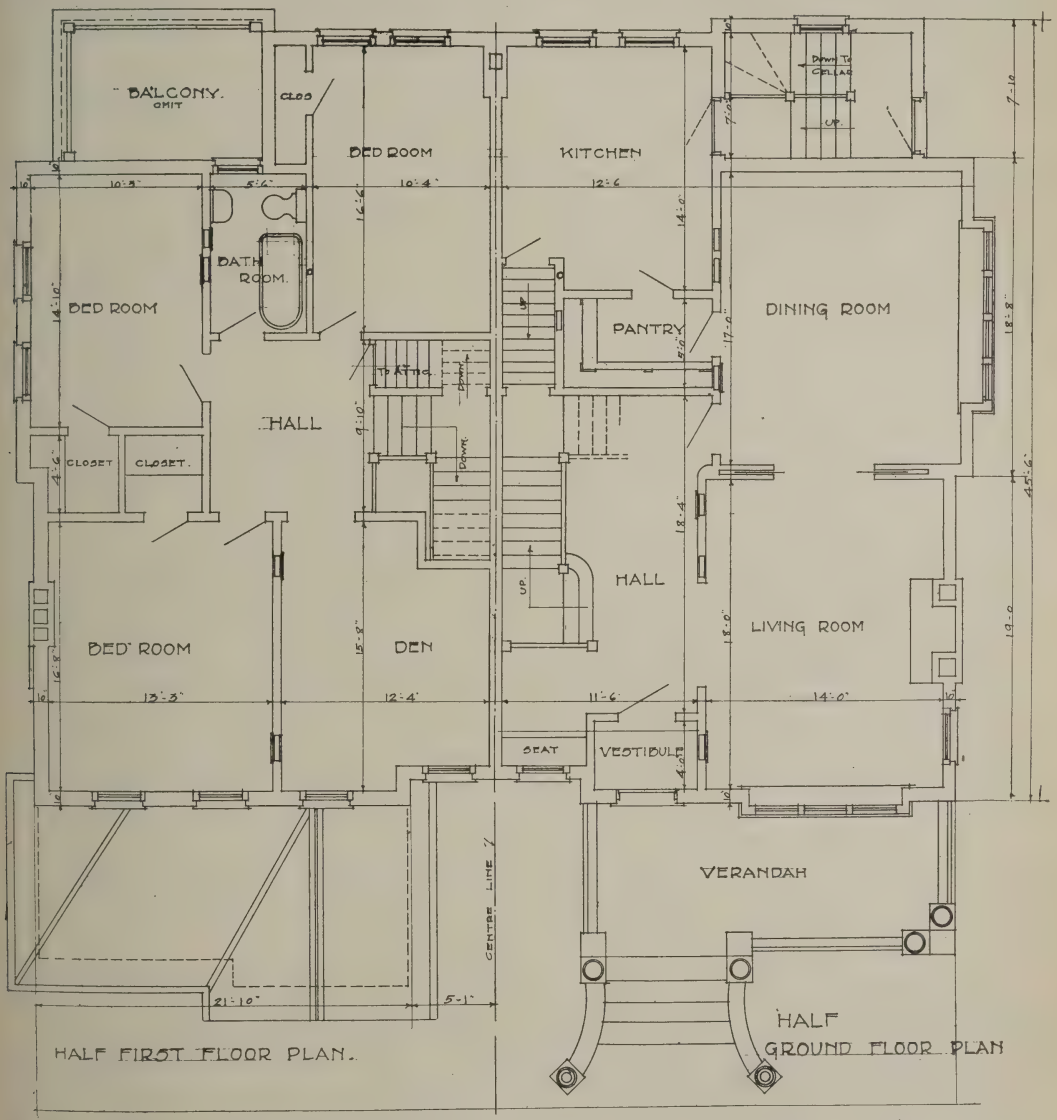
PROPORTIONS	CEMENT	AVERAGE	BBL.	SAND	CUB. YDS AVERAGE.	GRAVEL OR STONE CUBIC YARDS		AVERAGE..	
1 - 2 - 4	1.34	1 46	1.57	.41	43	.45	,81	.85	.88
1 - 2½ - 5	110	120	1.29	40	.43	46	.82	.86	91
1 - 3 - 6	.92	101	1.10	42	44	46	.84	.88	93
1 - 4 — 8	.71	.78	.85	.43	45	48	.86	91	.96

T. H. Wiley, Architect. Duplex Apartments. St. Catharines, Ont.

Duplex Apartments at St. Catherines, Ont.

By W. J. DUNN

WHILE this style of building is rather new to the pages of THE NATIONAL BUILDER, I know that it is one in which many of our readers are greatly interested and trust it will prove a benefit to them.



This apartment is 53 ft. 10 in. x 45 ft. 6 in. in size, making each apartment 26 ft. 11 in. x 45 ft. 6 in. There is a solid brick firewall from below cellar floor line to roof lines. The foundations are solid concrete to grade line, then coursed lime stone to joist line on first floor.

The exterior is of red pressed brick laid in white mortar with ¾-in. raked joints and trimmed with cement caps, sills, etc. The roof is shingled with best cedar shingles stained dark green. Gables are pebble-dash plastered and finished in English half-timbered style. Cornices are finished with brackets.

Main roof cornices have scrolled lookouts in form of exposed rafter ends.

Verandas have brick balustrades and columns. The floors are yellow yine 1¼ in. T. & G., and edges are given a coat of lead before laying. The ceilings are of yellow pine and panelled, finished natural. Roofs are shingled same as main roof.

The chimneys are lined with tile flue-lining and cement caps are built at top leaving part of flues exposed above the top of cap.

The vestibule, hall, stairs and living room are finished in mahogany. There is a seat in the hall. The stairs are built of birch, the rail, string, etc., are finished in mahogany; the risers and spindles are white enameled. The treads are oak finished natural. The floors of hall, vestibule and living room are of oak parquetry. There is a pressed brick mantel in living room.

The dining room is trimmed in chestnut finished natural. Walls are panelled in burlap with battens to height of plate rail. From plate rail walls and ceiling are sand finished plaster tinted and has a very fine stencil border.

Vestibule, hall and living room walls and ceiling are plastered sand finished with delicate stencil pattern as border.

Kitchen, pantry and grade entrance are finished in yellow pine, natural finish. Walls and ceilings are papered in Sanitas washable papers. Hardware in living room, dining room, hall and vestibule is brush brass finish; in kitchen, pantry and grade entrance, bauerbarff finish. Kitchens are equipped with gas ranges and heaters.

There is a service stair from kitchen to front stair landing, making a combination stair. Stair and trim are yellow pine, natural finish.

On second floor are hall, den, bath, three bed rooms, closets and balcony at rear. The den is finished in chestnut slightly darkened. Walls and ceilings sand finish with stencil border. Bed rooms have white pine trim painted to suit tint on sand finished walls and ceilings. Very delicate stencil border in these rooms. Bath has white pine trim, white enamelled and Keene cement plastered walls blocked in pattern to proper height, then sand finished plaster tinted white. Exposed pipes, hardware, etc., all nickel plated.

The hall is birch-mahogany trim. All hardware (except bath), brush brass finish.

There is one finished room in the attic plastered and tinted and has white pine trim painted. This is suitable for bed room or play room.

The basements have cement floors, walls, etc., and has a laundry, fruit room, coal bins, etc. The laundry is equipped with two-piece soapstone tubs, etc. There is also a water closet in each basement.

The heating is hot air throughout with side wall registers in each room. Pipes are run so as to heat rooms on both floors. This will allow shutting heat off on either floor, completely, if desired.

Each side is exactly the reverse of the other.

This apartment was built at St. Catharines, Ont., for Newman Bros., at a cost of approximately $8,500.

Concrete Methods

By CHAS. E. ANDERSON

(Continued from May.)

MIXING concrete by hand is not conceded to be quite as good a method as machine mixing with regard to the quality of the concrete, but with the proper care just as good concrete can be turned out by hand as with a mixer, the objection to hand mixing being that the men are likely, when not closely watched, to slight the mixing or sacrifice quality to speed. A mixing board 10 feet square will give room to mix 10 or more cubic feet of concrete. About eight men can work comfortable on a board this size. If it is desired to use fewer men, which is not advisable, the board should be built with sides one board high, like a box. The reason for this is that in applying the water to the dry concrete it sometimes runs off with some of the cement and quick work is necessary to stop it. A half dozen men can usually work fast enough with their shovels to stop any water which begins to runs off the board, but if fewer men are to be used it is best to be safeguarded by sides on the board. If wheelbarrows are used on the job the amount of gravel is usually

measured by the amount held in a wheelbarrow. The usual type of metal wheelbarrow holds 2½ cubic feet. The contents of a wheelbarrow may be measured by making a box which shall be 1 foot square, inside measurement, and filling the wheelbarrow from it. A bag of cement contains 1 cubic foot. Sometimes a measuring box is used. This may be made 4 feet square and a foot deep, with no bottom. It can then be laid on the mixing board and when filled 6 inches deep will contain eight cubic feet of gravel, added to which one bag of cement will give a 1 to 8 mix. If using stone and sand, the box may be filled 2¼ inches deep with sand and stone the stone placed on top of the sand, making a total depth of sand and stone of 6 inches. This will give a 1 to 3 to 5 mix. After the box has been filled to the required depth it can be lifted, leaving the ingredients on the mixing board ready to be mixed.

In mixing it is easier, although not necessary, to mix the sand and cement first dry; then add water to them and mix wet, adding the stone after the mortar is mixed. This saves shoveling the heavy stone a number of times. Of course, if gravel is used this does not apply. The sand or gravel should be first spread out thin and the cement distributed over it in an even layer. Using square-pointed shovels, four men line up on each side of the board. Two at each side of the center commence shoveling to the next two, and these two shovel it to the end of the board. At the same time two men shovel in the opposite direction to the next two, who shovel it to the other end of the board. After the dry concrete has been shoveled into two piles, one at each end of the board, the operation is reversed, shoveling back to the center in the same way. If the foreman makes sure that the men turn the stuff over thoroughly at each shovelful it should now be sufficiently mixed and should present a uniform color, which might be described as that of the sand modified by the color of the cement. The important part is that the color should be uniform, not showing sand here and cement there. If it has not this uniform appearance, it should be turned again.

After being mixed dry, the sand and cement are spread out, forming a saucer-like depression at its center, into which the water is placed. The mortar is then turned inward toward the center of the board until the water is taken up. The pile at the center is then shoveled toward the two ends of the board by the men ranged as before, four on each side of the board, while at the same time a man sprinkles water on the parts which are not sufficiently wet, being careful not to pour it on in sufficient quantities to wash out the cement. Care must be taken not to allow any of the water placed on the concrete to run off the board, as it will take a large amount of the cement with it. The mortar is then turned back to the center, and if stone is to be added it is spread out, the stone spread evenly over and turned once again. If desired, the stone may be added after the first wetting. The concrete is then shoveled into a chute which carries it to the forms, or shoveled directly into the forms. The mixture should be decidedly sloppy and should run like thick cream. After being placed in the forms, it should be thoroughly spaded. The mixture should not be allowed to run into the forms and remain as it will, a practice which spoils many a job, but every shovelful should be spaded. The men in the forms should be instructed when shoveling concrete against the front of the forms to turn their shovels so that the back of the shovel comes against the forms, allowing the soft "slush" to fall against the forms and the stones back from the face. The square-pointed shovel should then be thrust between the forms and the concrete, forcing back the stones and allowing the soft mortar to flush to the front and produce a good surface on the finished concrete. Every inch must be spaded in this manner if a first-class job is desired. There is a spade manufactured for spading the front of concrete forms which has holes in it to allow the grout to run through to the front. A hoe with the blade flattened out parallel to the handle makes a good implement for spading the front of forms. All concrete foundations should be carried below the frost line, or about 4 feet deep.

In building concrete walks a somewhat dryer mixture should be used, such that when tamped with the end of a 6-inch post or iron tamper the grout will work to the top to an even surface. In most ground there is a likelihood of water collecting beneath a walk and causing it to heave with

the frost. For this reason a sub-base should be prepared of a porous material and thoroughly compacted sufficiently to avoid any settlement. If the ground is gravelly or porous enough to afford good drainage, this may not be necessary. A good way to drain a walk is to excavate at one side, partly under the edge of the walk, a ditch about a foot below the bottom of the concrete and lay in it a line of 3-inch drain tile, filling the ditch with cinders and thoroughly compacting them. A good walk may be built of 1-2-4 concrete and enough mortar may be flushed to the top by tamping to finish the walk, or a finishing coat of 1-2 mortar may be applied. If the latter method is followed the finishing coat must be applied the same day as the foundation, or it will eventually crack off by virtue of the frost action. It is best to apply it immediately after tamping the foundation or body of the walk. A good walk usually has a 4-inch or deeper concrete body, covered by a 1-inch finishing coat. The walk should be divided into slabs, usually 4 feet long. The slabs may be made by forming alternate sections one day and putting in the intermediate slabs the following day. If the walk is made in a continuous operation, the slabs should be separated by sheet iron parting strips, to be removed just before floating the finishing coat. Care must be taken to have the joints in the finishing coat directly over those in the body; otherwise cracks will sooner or later appear over the joints in the concrete below, spoiling the appearance of the walk. Two by fours may be used as side forms for the walk, held in place by stakes. One side of the walk should be slightly lower than the other in order to provide drainage, the slope not to be greater than ¼-inch to the foot.

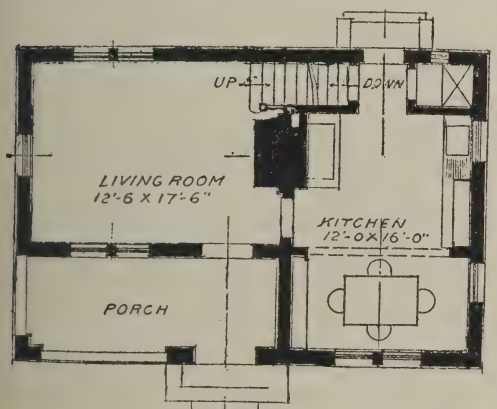
One of the most difficult operations connected with concrete work is to procure a proper finish on high-grade work. Plastering should never be resorted to, for the reason that it will eventually crack off. This is due to the action of frost. When the forms are properly built, cracks filled with soap or clay, and all offset or improperly matched joints planed smooth, it greatly simplifies the procedure of finishing the concrete. A few minutes spent on the forms may sometimes save several hours' much harder work on the concrete. In fact, the writer has, by care in the forms and by using a wet enough mix, properly spaded, procured a surface which it was unnecessary to finish in any manner whatsoever, the board marks being scarcely distinguishable.

The best way to finish up the surface of concrete is as follows: Use a carborundum brick of about the coarseness of a large grindstone. Mix about a heaping double handful of cement in a pailful of water. With a large whitewash brush wet the concrete surface to be finished with the cement water. Keeping the surface fairly wet, rub it with the carborundum brick until smooth. After a few square feet of wall have been rubbed, wet the brush again (not too wet this time), and with a light stroke go over the rubbed portion of the concrete to remove the marks of rubbing. In this way finish the wall, a few square feet at a time, keeping the wall quite wet while rubbing and not having the brush too wet on the second brushing. It must be remembered that the object of the process is not to paint the wall with a cement coating, but the cement in the water used is intended merely to liven up the dead cement, which is rubbed off by the carborundum and make it a part of the mass. If too much cement is used in the water it will give the concrete a bluish tinge and also form a coating which will crack off. A little practice will enable one to tell just how much cement in the water gives the best results and just how much to rub. The rubbing will loosen enough dead cement to fill any small air holes which may be apparent on the surface and the small amount of cement in the water livens it up so that the rubbing, by eliminiating any air space between the loosened material and the body, makes it an intimate part of the whole structure. It is difficult to say just how old the concrete should be before being rubbed. All that can be said is that it is not, as a rule, good policy to rub the concrete too green, although in some cases portions of the work can be worked to advantage while still quite soft; while, on the other hand, if allowed to get too hard it will be almost impossible to smooth the surface to any extent. Experience and judgment are the only guides available in a question of this kind.

Low Cost, Prize Homes

UNDER the direction of the Building Trades Employers' Association of New York, a competition was held recently for plans for inexpensive houses, that is, costing $2,500 and $4,500. The object was to demonstrate the application of modern building methods and materials to artistic designs so that comfortable and sightly houses might be had by the man of average means.

About two hundred plans were submitted, from which six were selected for prizes, three in the $2,500 class and three of the more expensive type. It was stipulated that the walls of the building be of concrete blocks or terra cotta blocks, to be finished with cement stucco; or hollow concrete blocks of



First Floor Plan.

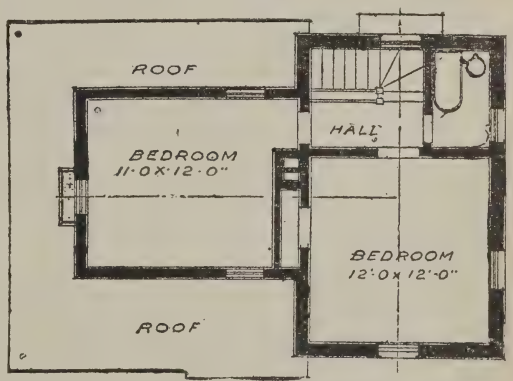
plain, paneled or bush hammered face, or they may be of monolithic construction, or lath finished with cement stucco. Wooden floor joists and room timbers could be used and roof coverings were specified of cement, tiles, slate, shingles or ready roofing. Chimneys of brick, concrete or stone cornices, porch rails and other details could be of wood or concrete.

The plans shown here are those of the first prize for a $2,500 house. They are by Robert L. Stevenson and contemplate a four-room cottage. Architect's general specifications are: Foundations of 12 inch blocks on concrete footing; upper walls of 8-inch T. C. blocks, stuccoed with a sand finish stippled; floor beams and partitions of spruce; shingle roof stained with light brown; all window and exterior door frames stained brown; first and attic floor walls and ceiling plastered rough floated; finish for living room of chestnut; kitchen of cypress stained; second story rooms whitewood painted; door of stock pattern; birch finish and maple flooring on first and attic floors.

Front.

Cost of material and labor is estimated as follows: Cubical contents, 12,936 feet, at 12 cents a cubic foot; total cost, $2,457.84.

Excavation and concrete footings.	$ 108.00
Terra cotta walls, including foundation walls	508.00
Wood floor beams, partitions and rough carpentry	482.00
Chimney and fireplace	60.00
Window and door frames	170.00



Second Floor Plan.

Shingle roof	120.00
Inside and outside plastering	306.00
Interior doors, trim, stairs, etc.	210.00
Finished wood floors	120.00
Painting	90.00
Hardware	55.00
Cutting and jobbing	40.00
	$2,269.00
Contractor's 10 per cent profit.	226.90
	$2,495.90

Building Contracts

By W. J. STANTON

WHEN the contractor is to furnish the materials and labor for the performance of a building contract requiring the erection of structures on the land of the builder, the materials remain the property of the contractor until they are affixed to the land of the builder, or are delivered to and accepted by him as his property. This rule is not deterred by the fact that the materials were purchased by the contractor with the intention of working them into the structure, or that they were brought upon the land of the builder, or that preliminary work has been done upon them so as to fit them for annexation to the structure, or that they have been tentatively affixed to the structure for the purpose of seeing whether they would fit and afterwards removed, or that the builder has made payments to the contractor as the work progressed.

If the materials are furnished by the builder, and the contractor is merely to use them in the performance of the work, they remain the property of the builder, and the same is true if they were purchased by the contractor as the agent of and on the credit of the builder. The parties may, by express agreement, provide that the materials furnished by the contractor shall become the property of the builder before they have been actually affixed to the structure; but an agreement that materials brought upon the premises of the builder shall become his property has been held not to make them so absolutely the property of the builder as to be subject to seizure under an execution against him.

A mere option given to the builder to take possession of and keep materials furnished by the contractor upon certain contingencies, has been held not to rest title thereto in the builder before he has exercised his option and taken possession. When the materials furnished by the contractor have been affixed to the structure so as to form a part of the real estate they become the property of the builder and cease to be the property of the contractor, though by express agreement they may remain the property of the contractor even after they have been affixed to the realty of the builder. In an Indiana case, a mill was built upon the land of another under an express contract by which it was to be the sole property of the builder until a judgment which was a lien upon the land should be paid by the owner. The court held that the builder had a right to remove the mill after a sale of the land on an execution issued upon such judgment. It has been held that where the contract is silent as to odd structures standing upon the land, whose removal is necessary to the performance of the contract, and makes no reference to the materials in them, they become the property of the contractor upon taking possession and removing them; but a right given to a lessee to make alterations does not entitle him to claim the materials taken out of the building in making the alterations.

Where materials are furnished by the contractor and work is performed in the construction of a chattel which remains in the custody and under the control of the contractor, no property passes to the person for whom the chattel is being constructed until the completion and delivery of the chattel. It is immaterial that the work is being performed on the land of the person for whom the chattel is being constructed, or that the contractor is paid in installments as the work progresses, or that a superintendent is appointed by the person for whom the chattel is intended, to overlook the work and see that it is done according to the tenor of the contract. A constructive delivery may be sufficient to vest title in the person for whom the chattel is being constructed, and the parties may by agreement vest title in such person as the work upon the chattel progresses. Where materials furnished by the contractor are united in the construction of a chattel with materials furnished by the person for whom the chattel is being constructed and the principal materials are furnished by the contractor, the materials worked into the chattel are the property of the contractor; but where the contractor constructs a chattel entirely from materials furnished by the person for whom the chattel is being constructed, the property in the chattel as constructed is in the latter.

Both the builder and contractor must perform all the obligations assumed by each, and if the builder fails to perform the obligations assumed by him, the contractor may

recover the damages he may suffer from such failure, as where the contractor suffers damages through delay of his work by reason of default on the part of the builder. The builder is, in the absence of any stipulation in the contract exempting him therefrom, liable for damages from delays caused by the failure of other contractors to perform work they have undertaken to do for the builder and which, as regards the former contractor, the builder was under obligation to do. The builder may, by express stipulation in the contract, exempt himself from liability to one contractor for delays caused to the latter. In the absence of such stipulation, where one contracts to do the carpenter work on a building, and to proceed forthwith without delay, the employer is bound to have the building in readiness to begin work within a reasonable time, and if he fails to do so, the contractor may recover his damages by reason of the delay.

Where the contractor is delayed by the failure of the builder duly to perform the obligations assumed by him, the fact that the contractor continues the work is not a waiver of his claim for damages for such delay. It has been held that the receipt by the contractor of the stipulated price for the performance of his contract is not a waiver of his claim for such damages. If the contractor fails to perform his part of the contract, the builder may recover damages therefor, and may recoup such damages from any claim on the part of the contractor for work done and material furnished in the part performance of the contract. If the contract expressly provides that upon the failure of the contractor to perform the builder shall annul the contract and retain the unpaid part of the compensation, the builder is restricted to this remedy, and cannot maintain an action for damages. So, if the contract provides that upon the failure of the contractor to perform he shall have no pay for work performed and materials furnished, this fixes the consequences of a failure of the contractor to perform, and the builder cannot maintain an action for damages for such failure. If the contract expressly requires the contractor to remedy any defects in his work after the building is completed and accepted, the contractor is entitled to notice of defects and an opportunity to remedy them, and without such notice and opportunity he cannot be held liable to the builder for damages for such defects.

(To be continued.)

Roof Framing

By A. A. STAFFORD

FREQUENTLY it occurs that a frame building needs some short rafters. While it does not seem possible that so many pieces on a building could be called rafters, yet to carefully study the different shapes, cuts and they way they are all assembled in a roof to advantage, might be worth any framer's while. How many men do we know that take a 2x4, hold it up nearly in place and scribe it to get the length of a porch rafter. (Any farmer can do that.) Then it might nearly fit. There are times when the scribe rule is in order and some very good mechanics use it but on the other hand, some men use it because they know of nothing else to use, and do not care to take the trouble to keep up with the times and learn about new tools. No man is to blame for what he does not know about his trade; he is to blame for what he will not learn.

The very same principle of getting the length of some rafters applies to them all. Measure across corner of square, rise and run, inches for feet, or even smaller if necessary, but by reducing rise and run equally, nearly any length can be easily obtained; then add back all of the reduction; for instance, a building 40 ft. wide would have a run of 20 ft., a pitch of 12 ft., and a rise of 20 ft., which is 20x20 inches too great to measure across corner of square. Reduce by one-half, 10x10 inches. Hyp. reads on rule 14 9-16". Now double this back 28 18/64". 28 inches equals 28 feet. 18/64 equals 3⅜ inches. The length of the common rafter will be 28'3⅜".

Let us see if this will work on a small porch rafter where there is no specified pitch per foot run. Say, plate line is 9 ft. out from the side of the building, equal to 9 ft. run on blade of square. Let 4 ft. 7 in. be all the rise we could have or want, 4 7/12" on tongue equals rise. Measure across corner of square 9"—4 7/12". This reads on

rule 10 3/32″, using 1″ equal to 1′ as the scale, and will make the rafter length 10′ 1⅛″; 9″ cut seat; 4 7/12″ cut top. Fig. 10.

We will now reason out a gable roof that will set at right angle on this other roof with the same pitch, and set the bottom of the

I wish to say to the brothers interested, it is not necessary at all times to get down to 64ths, but the closer you learn to measure and cut, the better mechanic you will be. Some of my routine would not figure out absolutely correct by square root, but it does

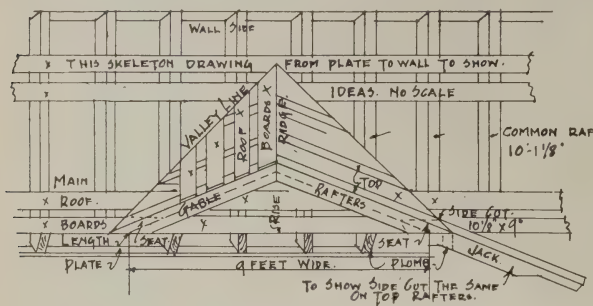


FIG. 9

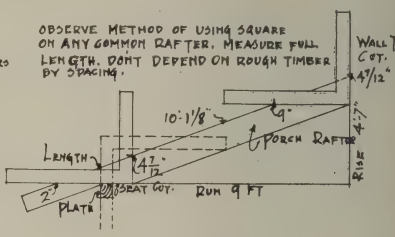


FIG 10

rafters flatly on top of the main roof boards. There is a side cut to these rafters at the seat, and many men wonder what figures on the square get this side cut. If the top rafters set right, their side cut forms a valley line. Then figure length and run of common rafter for side cut, the same as we would use on jack top to fit same line. A hip or valley side is always a square mitre to the run of common rafter. To get a common rafter to set on, or lean against them, we must use Hypothenuse (length of the pitch) by run for side cut—the only difference between jack and other rafter cuts is that the jack should be plumb cut and the other seat cut. The side cut is 9″ run, 10 3/32″ length. Always cut on length.

It is asked, "Where did you get that noise, length and run of common rafter for side cut of jacks to fit hip or valley?" Where did anyone get the idea of 17″ and 12″ for side cut of jacks to fit 12″ pitch? It is just simply hypothenuse or pitch that does it on any old roof, and if it will work on 12″ pitch, it will work on any pitch of a common roof.

As to side cut of hip or valley, that is taken from themselves, not from the common rafter, as they have a less rise to the foot than common rafter, but their total length by total run gets side cut just the same, or measure across corner of square from pitch inches to 17 inches. Use measure as length and 17 inches as run, because 17 inches is nearly hypothenuse of common rafter run 12″—12″ and the direction of hip or valley run.

come nearer correct than anyone will ever cut the material. Study the readings and drawings; put it to a practical use by illustrating, and convince yourself. Notice in Fig. 9 a section of porch roof and the gable mentioned, also at the right a jack extended to show side cut to equal same line as the side cut of small gable rafters that sets on top, and is on same line as jack or other common rafters, so the side cut must be the same.

How about length of these gable rafters? If you wish gable seat the same as porch, 9′, take one-half length of common rafter and use same figures to cut seat and top. Also take off the plumb thickness of board it sets on. If a different width gable, place square on straight edge board, rise and run, say in this same case. Gable to be 6′ front. Slide square on 9″ or run until 3″ is the reading. From 3″ to rise on tongue is the length. Always look out for what extra must come off top or bottom to suit your job, and when you have a fraction of an inch in measuring across the corner of square, be very careful to read it out right, for measuring 1″ equals 1′, and getting down into small fractions of an inch, it is very easy to make a mistake in length. A good way to educate one's self to these problems is to take suitable things and test out, by measuring, using square on straight edge, cutting out small models, etc. Such things can be done to illustrate tomorrow's roof to yourself at home, and no one need know where you learned it.

OUR READERS PAGES

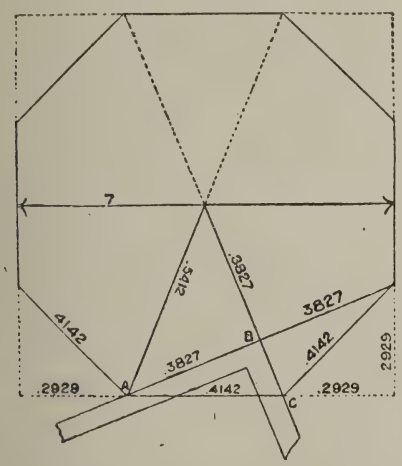
[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Ed.]

Answers

OCTAGON CUTS.

From "Young Workman," St. Paul, Minn.:

The question asked by S. K. of Franklin, Neb., with regard to octagon "cuts and lengths," seems to be a little mixed. The length of an octagon 12 ft. across, would be 12 feet, of course, but I don't think this is what he means. If it is, the matter is so



simple as to require no further explanation. To go further into the matter, however, I will endeavor to show the proportionate length in the octagon Fig. A; the diameter being one, the number on each line indicates its exact length in fractional parts of one. To lay out the miter or angle, place the square as shown at ABC. Take 12 in. on the blade of the square and 4 31/32 on the tongue; tongue gives cut. Any other number will do as well, providing the proportion of 3827 and 1585 exists between them.

This is a simple and correct method of finding the miter of an octagon, and the proper lengths of sides. This is taken from Hodgson's book, "The Steel Square and Its Uses," volume 2, which should be in the hands of every workman who wishes to know all about octagons or any other figure which may come in for investigation by the progressive workman.

POLE VS. TAPE-LINE.

From "Framer," Augusta, Maine:

I have been in the framing business for many years, in the wooded part of this state, and in the Province of New Brunswick, and have built myself, and assisted others, to frame a great number of stables, barns, houses, bridges, and other like work, and have yet to see the first framer to make use of a tape-line in laying out a timber frame of any kind. I cannot see any advantage whatever in using a tape-line in preference to a ten-foot pole, but could point out a number of very serious disadvantages—to be precise, it will require a man and a boy to hold the line taut while mortises and tenons are "pricked off," and both hands to take short distances, and it would be a clumsy affair anyway, and be the cause of lots of blunders. A ten-foot pole is always handy and reliable, and to prevent spiteful or jealous men from tampering with it, drive a long thin nail in each end of the pole, then it cannot well be cut shorter, as the nail or nails will stop the sawing; but under any circumstances it is well to examine the ends of the pole every time you are about to use it. Stick to your ten-foot pole, likewise to your two-foot rule and good old steel square.

FRAMING BRACES WITH UNEVEN "RUNS."

From "Framer," Augusta, Maine:

In reply to "Big Boy," Nelson, B. C.—I don't think I can do better than to say to him, he should get a copy of Hodgson's Book on the Steel Square, for in that he will find everything worth knowing regarding problems that can be solved by the square. I have a copy of his first work now over 30 years old, and it covers almost everything in framing and roofing. A later work of his shows a few newer things, and is perhaps better put together. On the question of laying out braces, regular or irregular runs, he says: "If we wish to lay out a brace having a three-foot run on both post and beam, the matter is quite simple, for we can take 12 in. on the tongue and 12 in. on the blade and transfer this distance three times on a straight line, and we have the extreme length of the brace from point to point, and by marking along the blade at one end of this length and along the tongue at the other end we also get the bevels. This is easy and simple enough, and without further refinements will give the lengths and bevels exactly for a flat-footed brace. When the run is different from the rise, as in the example shown at Fig. 1, the square is applied in a somewhat different manner. Here we have a run of three feet and a rise of four feet. To get the proper lengths and bevels for a brace to fit in this situation we must use 12 inches on the tongue and 16 inches on the blade, then the bevel of the upper end of the brace will be found along the line of the tongue, and the line of the blade will give the bevel for the foot of the brace. In this case the square is transferred three times, just as though the rise and run were both three feet; the difference being made by dividing the odd foot into three equal parts of 4 inches each and adding one part to the blade, thus making the gauge point on the blade 16 inches instead of 12 inches, which regulates the extra length and the change in bevels. A little study on the part of the reader will reveal to him how the square may be set to gauge points, so as to make a brace suitable for any rise and run of any right-angle frame work."

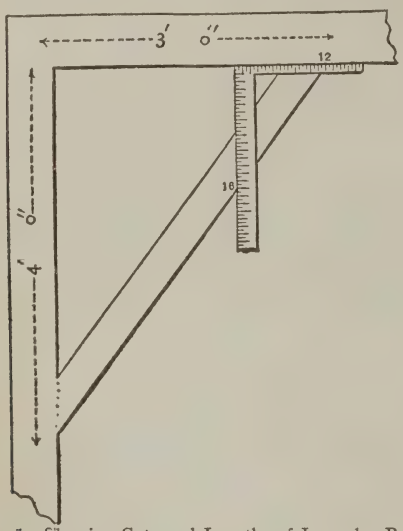


Fig. 1—Showing Cuts and Lengths of Irregular Brace.

AGE OF MORTAR.

From "Builder," Detroit, Mich.:

J. McD., Duluth, Minn. Mortar should be allowed to remain in its bed, after being made, at least ten days before being used. It would be all the better to let lay two weeks when possible.

EXPANDED METAL.

From "Builder," Detroit, Mich.:

With regard to the query of "Inquirer" of South Bend, regarding expanded metal, the term implies the rolled metal plates cut and drawn out by special machinery, at the same time bending the edge to provide an angle section. The iron should not be coated with any anti-rust process, but placed in the concrete with its natural surface and completely covered, as exposed iron is a source of weakness rather than strength. At first the use of expanded metal was restricted almost wholly to lathing for plastering, in which, as stated by the makers' catalogues, "the key is the thing"; but as the machinery for its development has been improved, it has become recognized as an effective binder for heavy floors, canal walls, docks, locks, and reservoirs, as well as for reclamation walls facing the sea in sheltered positions. The concrete is entangled in the meshes, and continuity of the metal work throughout can be secured by slightly overlapping the sheets. Uniform distribution of strength, combined with an effective keyage is also provided, and it needs no special supervision, as when independent rods or plates are introduced, to place the lattice work horizontally in a cor-

rect position in the concrete. Expanded metal also contributes strength laterally as well as longitudinally, and provides keyage by its depth derived from the mode of manufacture. The advantage gained by the lattice shape of the metal prevents a continuous line of stress as obtained in systems in which the stress is mainly given in one direction only, so that with the use of a diamond-shaped plate with open centres we have to allow a factor approximately of two to compensate for the angle of stress in its weakest direction.

EXPANDED METAL.

From H. B. McMaster, Youngstown, Ohio:

In the May number "Inquirer" of South Bend, Ind., asks for an explanation of the term "Expanded Metal."

Its use is apt, as the material in question is made by cutting slits in steel sheets, iron sheets or other metal and then pulling it out or "expanding" it. The result is a fabric made up of variously shaped holes enclosed by narrow strands of the metal.

When expanded from heavy gauge sheets—say No. 10—it is formed into a mesh of diamond shape about three inches wide and 6 inches to 8 inches long.

This is used most as a reinforcement of concrete in floor slabs and sewers, it is also much used for the sides of coke cars and in smaller meshes—say 1 inch to 2 inches wide—for tree guards, window guards, and clothes lockers for gymnasiums and armories.

Its greatest advantage as a reinforcement for concrete is that every ounce of metal in the fabric contributes to its strength; that is, there is no waste metal for spacing.

In other words, the stresses are distributed over an area of the fabric as would not be possible with other forms of reinforcement weight for weight.

Perhaps "expanded metal" has had its greatest use as "metal lath." Very soon after the invention of "expanded metal," the possibilities of its use for plastering were appreciated. There has been trouble for many years in getting "No. 1 white pine lath" under a specification, and even though the highest grade of wood lath is used, it cannot be prevented from absorbing some of the moisture from the plaster. Then there is always more or less free moisture in a building which is taken up by the plaster and where it is over the wood lath it is sucked through into the wood, but where it is over the spaces, the moisture is held there with the result that there are alternate strips of plaster of different degrees of moistness.

The strip having the most water in it will take up the most dirt and we then have what is so often seen—plastered walls and ceilings with each lath clearly outlined in water and dust, the constituents of "mud."

This condition makes impossible mural decorations of great value but it is quite obvious that "metal lath" with its non-absorptive quality and full key precludes the possibility mentioned.

Nor is there the possibility of plaster falling from the ceiling to interrupt a meal, break dishes and upset one's nerves when metal lath is used as with wood lath. The wood takes up and releases moisture alternately, with a corresponding contraction and expansion. This constant movement eventually cracks the plaster, breaks off the key by "shearing" between the expanding wood and finally loosens sufficiently to call—and the poor housewife does the rest.

These considerations most of all influenced the early use of expanded metal for plastering purposes, largely because the "metal lath" becomes so thoroughly embedded in the mortar that it is like reinforced concrete.

A later development was its adaptation to fireproofing. With increasing attention being paid to improving construction to the end that fires may be prevented, and our created resources conserved, the use of "expanded metal lath" grew very rapidly until now it is quite generally used for ceilings and partitions, protection of steel members, elevator and stairway enclosures, belt ways, and vents and shafts of all kinds leading from one floor to another, for the reason that it has a minimum of weight, is saving of space, is sanitary, economical and permanent, and has great fire-resisting qualities.

A more recent use of "expanded metal lath" and one that promises to give it greater popularity than any of its other uses is for stucco on the outside of residences. The popularity of stucco is explained when one gazes at such a building of good architectural lines with its soft gray tints harmonizing so pleasingly with nature's color tones.

It has an air of permanency like stone or

brick and therefore must be built to last so that it will not fail perceptibly from year to year but will age gracefully. This expectation is realized with the use of cement plaster and "expanded metal lath."

There are several kinds of "expanded metal lath" which may be generally classified as follows: Diamond mesh, ribbed and corrugated or spiral diamond mesh. There is also a type of metal lath known as sheet lath, which is not "expanded" and there are several manufacturers making a fabric combining the functions of metal lath and metal studding.

Among the manufacturers of metal lath are the American Rolling Mill Company, Middletown, Ohio; the Berger Manufacturing Company, Canton, Ohio; the Bostwick Steel Lath Company, Niles, Ohio; Consolidated Expanded Metal Companies, Rankin, Pa.; Eastern Expanded Metal Company, 201 Devonshire street, Boston, Mass.; the Garry Iron and Steel Company, Niles, Ohio; the General Fireproofing Company, Youngstown, Ohio; North Western Expanded Metal Company, Old Colony building, Chicago, Ill.; the Sykes Metal Lath and Roofing Company, Niles, Ohio, and the Trussed Concrete Steel Company, Detroit, Mich.

Typical specifications for stucco are given on another page of this number, and samples of metal lath can be gotten from any of the above or by writing to the Associated Metal Lath Manufacturers, 812 Wick building, Youngstown, Ohio.

GARAGES.

From "Architect," Buffalo, N. Y.:

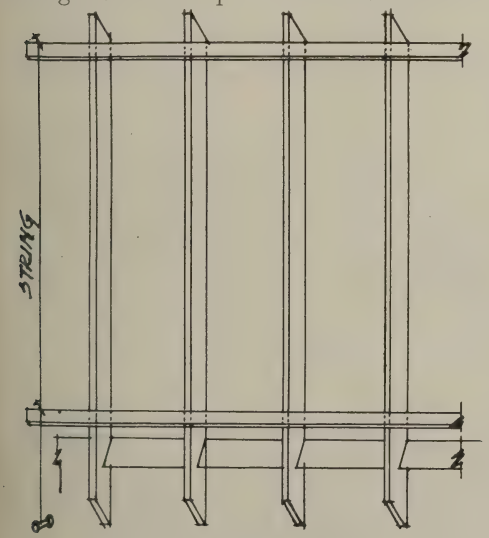
The following is offered for the benefit of "Contractor, Germantown":

The construction generally, having regard to the fact that we have to deal with a most inflammable and explosive substance in the form of gasoline, should be of fireproof material, well lighted and ventilated. It is important not to have closed drains in a motor house, as not only does waste lubricating oil soon stop them up or render them foul or insanitary, but they might also, in the event of any gasoline escaping into them, constitute a serious danger, by being loaded with an explosive mixture. In place of closed drains, half round or grooved channels should be formed in the floor, and carried outside the building before they join any drainage system; these channels being always open, can be readily cleansed. The position of the building should be so arranged that the drive in is without any sharp or awkward corners, and enough space allowed outside, close to the entrance, to enable a motor car to be comfortably turned. The floor of the motor house should be laid to proper grade so that the lubricating oil which frequently drops from a motor car when at rest, is kept as much as possible from the rubber tires, as oil is most prejudicial to rubber. It is not desirable to employ naked lights in or about the motor house, and electricity is the only safe artificial lighting medium; in no case should gas be used. Heat of some kind is an advantage in winter, as the water surrounding the cylinders in the engine is liable to freeze, in which case, serious harm to the motor is the result. The most suitable form of heating is by means of hot water or steam pipes; an open fire must not be resorted to. For washing the car an open space should be provided adjoining the motor house, and a glass roof over it is always a convenience; if possible, this should be made large enough to accommodate an examination pit, which is almost necessary. The pit should be so situated as to have plenty of natural light, unless electricity is available, when it is not so important. In size the pit should be 2 ft. 9 in. wide, 4 ft. deep, and about 6 ft. long. In one corner a small sump hole with an open grating over it should be arranged to collect any wet or dirt; a cover flush with the surrounding floor level should be provided of stout wood, with sunk handles, and divided into such lengths as to be easily raised. A mud collector should be fitted to the gulley which drains the washing space. Gasoline must never under any circumstances be stored in the motor-house; it should at all times be kept as far as possible away from all buildings and plenty of ventilation provided for. Before gasoline can be stored in large quantities or offered for sale, it is necessary to obtain permission from the local authority. The outside dimensions of a car should not exceed 6 ft. in width and average from 10 to 16 ft. long with head lamps in position, but it is well to remember that the present tendency is always to increase the length of the car. The doorway should not be less than 8 ft. 6 in. high. This will be found sufficient for all cars,

even if fitted with closed-in or canopied top. A clearance of at least 2 ft. should be allowed on either side of the car when in the house, and room allowed for a small engineer's bench, either at one side or at the end of the house, well supplied with natural light. In the case of a public garage or where hotels are catered to it is advisable to provide the following accommodations: A room for mechanics; separate lavatories for mechanics and car owners; an engineer's shop, fitted with a small forge where possible. Pits: on the average one pit should be provided for every ten cars to be stored. Suitable glass-covered washing accommodation is also of great advantage. Lock-up lockers not less than 4 ft. by 4 ft. by 2 ft. 6 in. deep, where all spare parts, tires, rugs, etc., can be stored, are necessary. A turntable let in flush with the floor, about 12 ft. in diameter, will often be found an excellent arrangement where a number of cars have to be dealt with. This should be placed in a central position in the motor house, and will often enable an awkward shaped site to be utilized to the best advantage.

A ROOFING NOTE.

A. L. H., Bar Harbor, Me. I wish to speak a few words with regard to taking advantage of certain parts of the construction



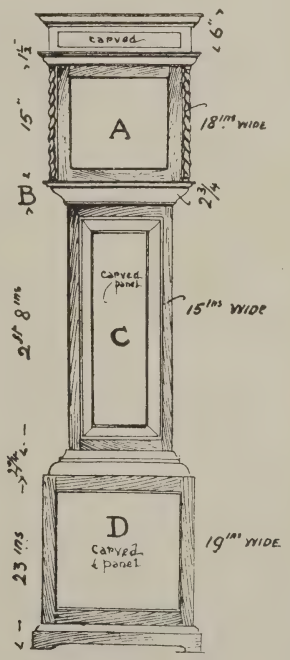
Lining Up Gable Ends.

of wooden buildings, in this cold country, and one thing that occurs to me at this time is the sawing down of the "rake" on gables. In many places contractors save the poorest of the material for boarding the roof, and many times the boards are second-hand and full of nails, in which case nothing is harder than lining down and sawing said rakes, especially on the left-handed corners when the roof is icy. As the gable ends should always be boarded up before the sides and dormers, I suggest tacking a strip across the upper ends of the two outside rafters, and drawing a line down the rake to the first board to be put on the eaves, or foot of the rafters, then each board is easily put on to just clear the line.

GRANDFATHER'S CLOCK CASE.

From "Amateur," Buffalo, N. Y.:

In reply to C. B., Medina, Ohio, I submit the following, which I think will cover his query in March number of the NATIONAL



GRANDFATHER CLOCK

BUILDER. The space marked "carved" will serve to fill in with the proposed motto. While I give the design in full, and dimensions, it is not necessary to build the case as there shown, though the figures will help materially to form a design that will be in good taste and suitable to the purpose. If desired, the top of the case may be finished with scrolls or ornamental turnings. I hope this will be found available, and that C. B.

will tell us all about it when he gets it finished.

With regard to your scrapers, perhaps you have too much of the blade uncovered. The blade should not show any more than about the same as a cutting iron of a smooth plane, or you may not hold it at the proper angle. Put the cover low enough over the iron so that there will be no "chattering," and make it fast and tight. There should be no "chattering" or jumping in the blade, no matter what is the make of the scraper.

A CIRCULAR LOUVRE.

From J. F. G., Elbow, Sask., in answer to Willis B., Middletown, N. Y.:

In constructing a circular louvre, the base is formed of several thicknesses of wood cut as shown at plan (Fig. 2), and laid one on

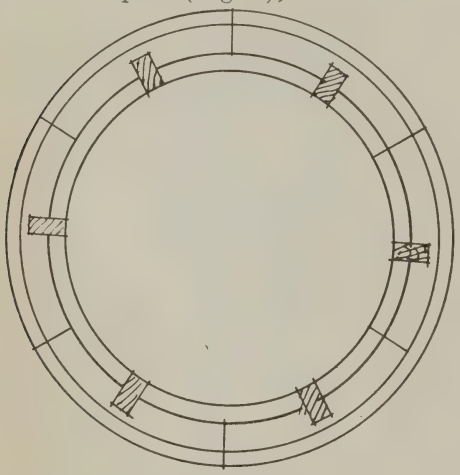


FIG. 2.

top of another, care being taken to break the joints. The cornice should be made in the same manner and all moulding worked in the solid. The frame is hexagonal and should be laid out on plan full size, when the top and bottom cuts of louvres may be obtained by describing circles at distances required. The method of marking out the louvres is shown in Fig. 3, and should be cut with a band saw.

ROOF PROBLEM.

From Wood Butcher, Chicago, in answer to A. D., Sweetwater, Tex.:

As to your roof problem in the April issue of THE NATIONAL BUILDER, I see that no one tackled it in the May issue, so will give you what little I know about roof framing. As your roof is up, there is not much chance to change it without quite a little expense. The easiest and best looking job would have been to make two uneven pitches on the back roofs and run the short hip of

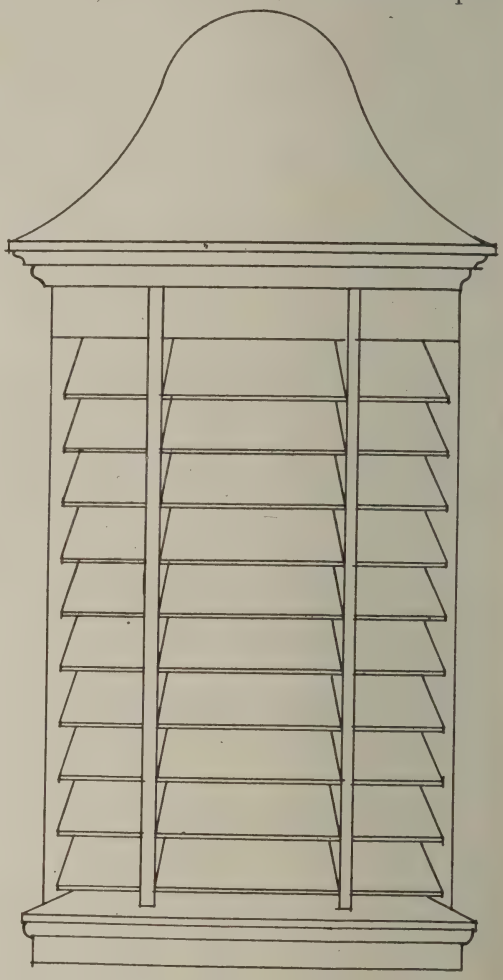


FIG. 1.

the main roof down to the intersecting ridge. For instance; if you have a 12-inch pitch, your ridge A is 8 feet high, and ridge B is 7 feet high. Flat one and raise the other, making both 7 feet 6 inches. This, of course, changes the valleys and makes uneven cuts on rafters, but frame accordingly, as rise and run always cut top and seat of a rafter, while length and run always cut side cut of it. If you wish valley and short hip in perfect

line, frame valley rafter clear to main ridge, passing 7 feet 6 inches at ridge B. Frame back main hip same length, then they may be a little longer than the front ones. It depends on measurements. If this idea does not suit you, correspond with the editor, and I will submit other ways.

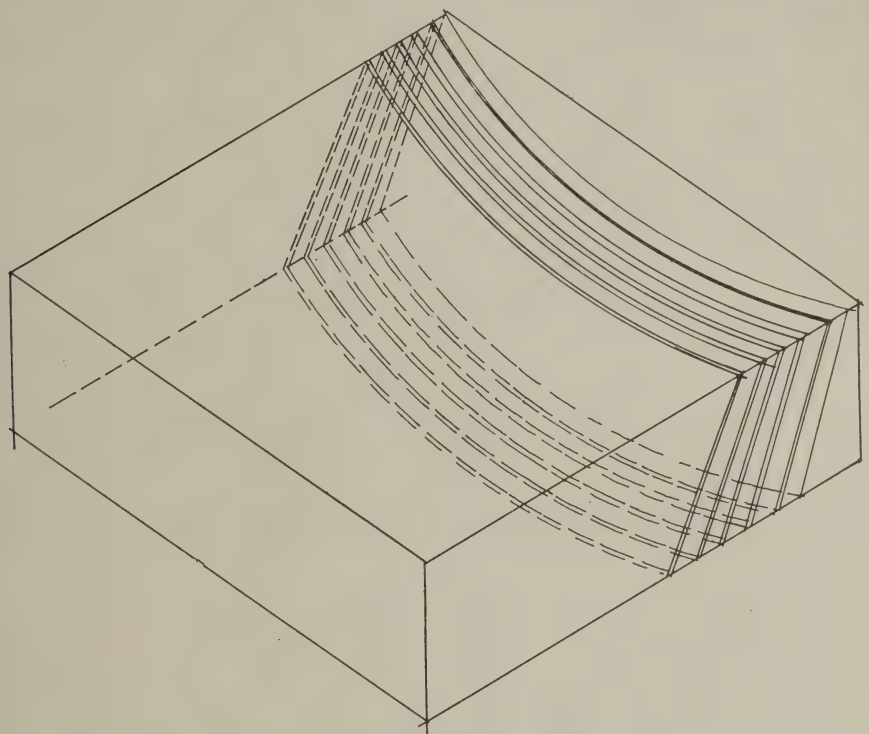


FIG. 3.

LATHING.

From "Workman," Green Bay, Wis.:

One would think by reading the trade papers that the old style of wood lath for plastering purposes had fallen into disuse, as being no good, costly and foolish to use, as being unfit for plastered walls. There never was a greater mistake. It is many years since I left the old country, but where I lived there were buildings standing that had been erected, finished and plastered more than 300 years previously, and are as good today as when first finished. Of course, most of the lathing was oak or ash—this would make some difference, but not a great deal. Buildings here in Green Bay were lathed and plastered in the old fashioned way when the place was first settled, and some of them which still exist are as good as when first finished. Is it a fact that expanded or metal lath is much better than wood lath, and if so, why?

FRAMING BRACES.

From J. B., Lead, S. D., in answer to "The Big Boy from Nelson, B. C.":

It is just as easy to get the length and cuts of an uneven run of braces when you know how, as the even run, and it is done in the following manner: Say the run on girt is 3 feet and on post 4 feet. Lay the square on the stick or timber four times as follows: Say 12 inches on blade and 9 inches on tongue. The 12 side will give you the cut for post and the 9-inch or tongue side will give you the cut that nails to the girt. For this reason, 4x12=48 and 4x9=36. Now for the 4'6" on post and 3'6" on girt—it is done in the same manner. Say use 13½ inches on blade of square and 10½ inches on tongue. Do this four times and you have the result required. The reason is the same 4x13½=54 and 4x10½ =42 and this rule will apply to most any brace.

Questions

From "Western Carpenter," Edmonton, Sask.:

I would like some experienced carpenter to inform me of the best available—or what he or they may think are the best and most efficient tools a young fellow should buy when gathering up a good working outfit for general use. Please name the tools and oblige.

METAL SHINGLES.

From "Inquirer," Toledo, Ohio:

What difference in lasting quality is there between the so-called metal shingles, and shingles made from cypress, red-wood, white pine or cedar? I have considerable shingling to do this summer, and would like to be able to advise my clients intelligently. Any information will be thankfully received.

STREET PAVEMENT.

From K. M. B., Coalgate, Okla.:

I would be pleased to receive through the columns of the paper something on the pavement question of the streets. That is, the different kinds, cost and wear; also your best opinion of what is best for a small city.

DROP OF OIL.

From "Puzzled," Chicago, Ill.:

I want to oil a fine machine, and I cannot get an oil-can spout to it, because of some obstructions, and I must not let any oil drop on the works below. A small drop of oil will be sufficient for the purpose. Will some one aid me?

A Note: I received a short letter the other day, apparently from Indianapolis—and from a manufacturer—asking me personally as to the size of our Canadian circulation. If the letter had been signed, I would gladly have replied at length, and if the gentleman will kindly send me his address he will hear from me at once. At the present all we can say is that the circulation of the NATIONAL BUILDER in Canada, chiefly in Ontario, and in the north and west, is larger than all the building papers in Canada clubbed together. —Ed.

Now tell us how you like the paper since it has changed.

Pitch and Length of Rafters

By J. BARRY

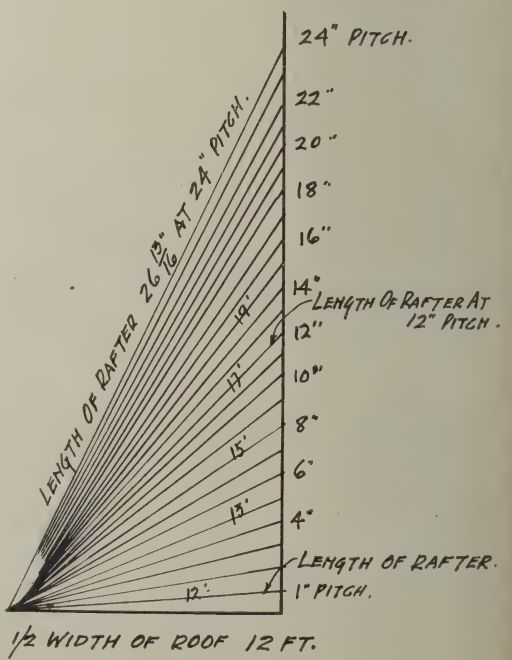
The pitch of rafters means the number of inches they rise in one foot of run, as shown in the sketch.

The length of a rafter is obtained by measuring diagonally across the steel square from 12 inches on the blade for the run to whatever the rise is on the tongue, which will give the length of rafter for each foot of run. (See sketch.) Multiply these distances by half the width of the building, and you will have the length of the common rafter; or, mark off on the top corner of stick the same number of times.

Any mechanic will clearly see that the blade of square marks the bottom cut and the tongue marks the top of the plumb cut.

Rafters of any size can be laid out by this method and relied upon as being correct.

For hip and valley rafters, use 17 inches for run in place of 12 inches.



The Most Useful Shop Machinery

By I. P. HICKS

IN SPEAKING of the most useful shop machinery, we mean the most useful for the small shop and the small contractor in the smaller towns. We presume this is the most interesting point, for in large towns and cities all kinds of machinery comes into more or less use.

It seems to us that the equipment of the small shop is the interesting point just at this time, and it is with that we propose to deal at the present time. To the small contractor the matter of expense is always one particular feature that the contractor has always to keep in view. Inexpensive equipment, but of the most serviceable kind, is what is wanted. First, a hand power rip saw is one of the best machines. There are good ones on the market and most of them can be run by power, if so desired. A rip saw machine can be made to rabbet door jambs, plow window jambs, and various odd jobs to a very great advantage.

Next comes the foot power mortising machines. One of these is almost indispensable in a carpenter shop. With it mortises for screen doors, screen windows, and all small doors, such as cupboards, china closets, medicine cabinets, etc., can be quickly and accurately made. A tennoning machine is also very good to have, but is not quite so essential as the mortiser. These machines will help make work for winter seasons in the way of making storm sash, for which there is always a demand.

If the shop is to be supplied with power, then there are other machines that will be found to be of great service. A jointer, a moulder, sticker, a swing, circular, cut-off saw, a lathe, and power mortising machine should be added to the list; also a band saw. unless a shop is equipped with power, these last named machines are useless.

It is only on light work that man power machines can be used to advantage and, therefore, we can recommend but few of such machines for shop work. To be effective, a machine of any kind must be supplied with the necessary amount of power. In towns where there is electric power, electric power is one of the handiest forms in use today, as it is always ready and is "Johnny on the spot." As a rule, it is too expensive for the small jobber and its use is thus often discarded on the matter of expense.

Probably gasoline engines are among the best all-around power plants for the contractor running the small shop. They require few repairs, little attention, no coal to steam up, and can be started and stopped at will, as may be required. They are good for the small shop, beyond all doubt.

In the small town the contractor usually makes all the frames for the buildings which he erects. This being the case, it is decidedly to his advantage to have some means of ripping lumber—the hand method of ripping lumber for frames is entirely too slow and tiresome—and we would say to even the smallest contractor: Get a circular rip saw machine, if nothing more; then work up by degrees and add to your equipment as fast as your circumstances will permit.

Typical Specifications for Stucco on Metal Lath*

FOREWORD.

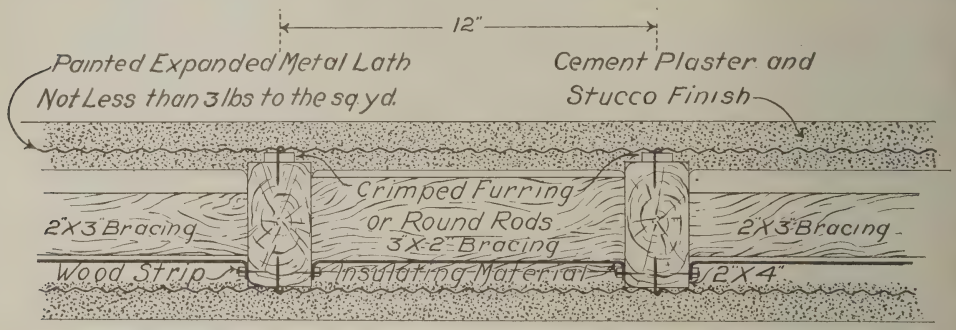
The merits of the stucco house are now so well recognized that arguments in its favor seem to be trite. It is assumed that the prospective builder and his architect want a stucco exterior and realizing that when built, the house will look as substantial as stone, brick or solid concrete they want a structure that will age slowly and gracefully through decades—not fail perceptibly from year to year.

This specification is offered with this realization promised, but it must be borne in mind that poor work is dear at any price. A faithful observance of every detail will give results gratifying to the architect and satisfactory to the owner.

*Recommended by Associated Metal Lath Manufacturers, 812 Wick building, Youngstown, Ohio.

Metal lath is recommended because wood lath absorbs moisture required by the mortar. Wood lath drys out and shrinks away from the plaster following which the alternate shrinkage and swelling resulting from moisture causes unsightly cracks and finally failure. Wood lath, also, increases the fire risk and it will harbor vermin.

Metal lath in combination with cement plaster is "reinforced concrete" and will insure an unbroken surface,—to be assured of which is at least an uncertainty when the plaster is applied direct to a wall set up in block form. The air space afforded by metal lath construction is the most efficient insulation.



Detail Showing Section of Exterior Wall

FRAMING AND GENERAL CONSTRUCTION.

Flimsy construction in framing is false economy. The best will prove cheapest. The studs spaced at 12 inches between centers wherever possible, should be run entirely from foundation to the rafters without any intervening horizontal grain in the wood. These studs shall be tied together just below the second story joists by a 6-inch board which shall be let into the studs on their inner side, so as to be flush and securely nailed to them. This board will also act as a sill for the second story joists, which in addition will be securely spiked to the sides of the studs. At two points between the foundation and the eaves, brace between the studding with 2x3 inch bridging placed horizontally but with the faces of the bridging inclined in alternate directions in adjacent spaces.

All roof gutters should be fixed and down-spouts put up before the plastering is done; the down-spouts should be temporarily placed about a foot from the wall so there will be no break in the plastering where they are to be finally fixed.

Wood copings or rails for stops of parapets, balustrades, etc., are not so good as cement for they may curl up, warp, check, crack, and in various ways fail to do what they should—keep water from getting behind the plaster. This also applies to brick chimneys which when plastered should have wide and tight caps of concrete or stone to prevent water running behind the plaster.

If only wood sills are used, they should project well from the face of the plaster and should have a good drip; either by being placed with a downward slant or by a groove rebated in the under side of the sill near enough to its edge that it will not be covered by plaster. The drip is an essential of good stucco construction that can not be slighted. It must be used to prevent water getting behind the plaster.

Lath and plaster should not be carried all the way down to the ground; this same restriction applies to brick or stone.

Care should be taken that all trim be placed the proper distance from the studding or furring to show its right projection after the plaster is on. It is a common mistake to allow too little for the lath and plaster, with the result that mouldings which should project from the face of the wall are back from it or partly buried under the plaster, thus missing the effect desired. About 1½ inches should be allowed for the lath and plaster, making sure that the projection of the moulding to show when finished is not measured in as part of this thickness.

FURRING.

Use painted or galvanized steel rods or painted or galvanized crimped furring. One-quarter inch is best and it should not be over one-half inch at the most. This furring is to be applied along the face of the studding with galvanized staples.

INSULATION.

After the lath on the outside has been back-plastered the air space may be divided by applying heavy building paper, quilting, felt or some suitable insulating material between the studs, fastening it by nailing wood strips over folded ends of the material. This insulation should be so fastened as to clear the 2-inch bridging, leaving the preponderance of the air space on the outside. Care must be taken to keep the insulating material clear of the outside plaster and to make tight joints against the wood framing at the top and bottom of the spaces and against the bridging where the 3-inch face intercepts.

CORNER BEAD.

If corner bead is not used, there should be 6-inch strips of metal lath bent around the corners and stapled over the lathing unless the sheets of metal lath as applied are folded around the corners.

Even though corner bead is used, it is a good precaution to bind the corners in this way and apply the corner bead over the strips of lath.

LATHING.

The lath shall be painted to protect it until it can be applied and covered with Portland cement plaster. Care should be taken not to expose the lath to the weather while it is lying about the building.

Use metal lath weighing not less than 3 pounds per square yard spaced at 12-inch centers and fastened horizontally over the furring strips with galvanized staples 1¼x No. 14 gauge. The sheets between furring are to be tied with No. 18 gauge galvanized wire.

PLASTERING.

Portland cement will protect metal from corrosion absolutely by reason of its moisture-resisting qualities. Calcined gypsum should not be used in combination with Portland cement; the gypsum will destroy the protective quality in the cement and neither should it be used as a substitute for Portland cement. A gypsum plaster may repel moisture for a time, but Portland cement actually thrives on it.

It is not theory only that Portland cement will preserve iron or steel indefinitely; it has been well demonstrated that Portland cement stucco will endure in any habitable climate. The first and second coats should be of good thickness and the finishing coat should have with it a mixture of waterproofing. A total thickness of plaster of about 1½ inches is good practice.

It is aimed for the first and second coats to get a Portland cement mortar with as little lime in it as will make it work properly. Clean long winter cattle hair should be used.

For first and second coats and back-plastering, mix in the following proportions:

Lime Mortar—2 barrels of hydrated lime, 1 yard of clean, sharp sand, free from loam; 4 bushels cattle hair. Make up at least 3 days before using.

Cement Mortar—2 parts of clean, sharp sand, free from loam; 1 part Portland cement. Mix fresh in small batches as used.

The lime mortar and cement mortar should be mixed and tempered separately, measured carefully, equal parts of each and mixed well togther.

In plastering over the face of the stud, the plaster should be forced well through the lath in order to fill entirely the space between the lath and the stud.

The back-plastering should be a heavy coat well troweled so that the lath is entirely enveloped. The finish coat may be done in a way to get any one of the many surfaces which give stucco its charm; this coat should contain no lime as it makes the wall more porous and if a lighter color is wanted than can be gotten with ordinary cement, a white Portland cement should be used.

The waterproofing acceptable to the architect should be mixed with the last coat of the exterior according to directions given by the waterproofing manufacturer. The lathing and plastering on the inner side of the wall need not differ from ordinary practice.

The exterior plaster must not be allowed to set rapidly. If necessary, hang a curtain in front of the wall, of burlap or other material that can be kept moist for a couple of days. Stucco should never be applied when the temperature is below freezing.

Finishing Oak Floors

By W. L. CLAFFEY.

THE finishing of an oak floor is a very important feature, upon which authorities fail to agree, but the question resolves itself into a matter of cost, as to the color or brilliancy of finish desired. Personal taste, artistic or decorative effects are the guide for the floor finisher.

The "Clear" grade of oak flooring should have a natural oak filler—color of oak. The "Select" and "Sap Clear" grades a light golden oak filler should be used, and after the floor is filled, it should be gone over with a little burnt umber mixed with turpentine to darken light streaks. This will make the "Select" and "Sap Clear" grades look like the "Clear" grade, except that it will be slightly darker in color. In filling the "No. 1 Common" grade, a dark golden oak filler should be employed, and the light streaks should be darkened in the same manner as the "Select" and "Sap Clear" grades. If a little care is used in laying this grade, splendid results can be obtained.

First—Treat the floor with a paste filler of desired tone, to fill up the pores and crevices. To thin the filler for application, one has a choice of using turpentine, benzine, wood alcohol or gasoline to get the right consistency. When the gloss has left the filler, rub off with excelsior or cloth, rubbing against the grain of the wood. This will make a perfectly smooth and level surface. It keeps out dirt and forms a good foundation, which is the key note for successful treatment of floors. Allow the filler twelve hours to set or dry before applying a wax or varnish finish. Never use a liquid filler on any floor.

A wax or varnish finish can be used. The wax finish is preferred by many, due to economy and ease of renewing places that show the wear. The renewing can be easily applied by housekeeper or servant.

Wax Finish—The best method for applying the wax is to take cheesecloth and double it to get a little more thickness; then make it into a sort of bag. Put a handful of wax inside of this and go over the floor thoroughly. You will find that you can work the wax through the meshes of the cheesecloth to give an even coating over the floor. This prevents too much wax in spots and wasting it. After the floor has been gone over with the wax and allowed to dry say about twenty minutes, it is ready for polishing. Rub to a polish with a weighted floor brush, first across the grain of the wood, then with it (a clean, soft cloth can be used in place of the brush if desired); then a piece of woolen felt or carpet should be placed under the brush to give the finishing gloss. After waiting an hour, a second coat of wax should be applied in the same way as the first and rubbed to a polish.

Varnish Finish—This is usually more expensive than the wax finish, but it gives a very hard surface, yet at the same time it is elastic. Two or three coats should be applied after the application of the paste filler. Each coat should be thoroughly rubbed with oil and pumice. Any of the standard hardwood flooring varnishes are recommended.

Floor Oil Finish—When a high class finish is not desired, a very economical finish can be had by the use of a light flooring oil, that is made expressly for this purpose by many paint and varnish houses and oil makers; it serves as a filler as well as a finish and is strongly recommended for oak flooring in public institutions, office buildings and stores. This oil keeps the dust from rising and preserves the floor.

Tasmanian Oak

Tasmanian oak, or, as it is sometimes called, stringy bark, is now being shipped from Hobart to the United States in large quantities. It is especially suitable for harbor construction, being one of the densest timbers in the world and immune from the attacks of marine insects. It is one of the few kinds which can be obtained in great lengths and contains a resinous substance which resists the Xylophages. There is an essential oil in the wood which prevents it rotting under exposure to moisture.

Solid Wall Concrete Silos

By PERCY H. WILSON.

THE principal source of profit in dairying, stock raising, and farming lies in improving the quality and at the same time keeping down the cost of production. In this matter of profit and loss nothing plays such an important part as the question of feeds and feeding. The natural feed for animals, the one on which they do best, is green pasture. In climates subject to frost, man has made the same provision for animals as for himself by providing them in winter with canned green fodder called "silage." Silage is made most commonly from corn, cow peas, clover, sorghum, or alfalfa, merely chopped fine and stored in large water-tight cans known as "silos." In dry weather or in winter, when green pasture cannot be had, this feed is equally good in producing a flow of milk or in putting fat on animals. One acre of a crop harvested as silage will feed twice as much stock as the same amount harvested in any other manner.

Like a glass fruit jar, a silo must be water-tight and jointless to keep the silage from moulding or "dry firing." For this reason, and also because no painting or repairing is ever necessary, solid-wall concrete silos are coming into general use.

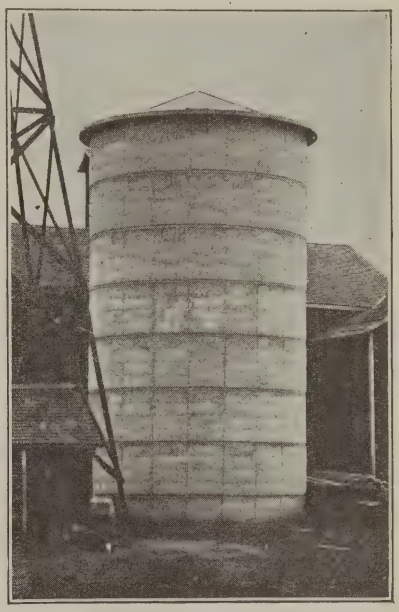
SELECTING THE SIZE OF THE SILO.

The best silos are built circular in shape. The size depends upon how many animals

Number of Cows in Herd.	Feed for 180 Days.				Feed for 240 Days.			
	Estimated Tonnage of Silage Consumed.	Size of Silo.		Corn Acreage Required at 15 Tons to Acre	Estimated Tonnage of Silage Consumed.	Size of Silo.		Corn Acreage Required at 15 Tons to Acre.
		Diameter.	Height.			Diameter.	Height.	
	Tons.	Feet.	Feet.	Acres.	Tons.	Feet.	Feet.	Acres.
10	36	10	25	2½	48	10	31	3½
12	43	10	28	3	57	10	35	4
15	54	11	29	4	72	11	36	5
20	72	12	32	5	96	12	39	6½
25	90	13	33	6	120	13	40	8
30	108	14	34	7½	144	15	37	10
35	126	15	34	8½	168	16	38	11
40	144	16	35	10	192	17	39	13
45	162	16	37	11	216	18	39	14½
50	180	17	37	12	240	19	39	16
60	216	18	39	14½	288	20	40	19
70	252	19	40	17	336	.	..	..

are to be fed daily, the quantity in pounds for each animal's daily feed, and the number of days it may be necessary to feed them. The silo should be of such size that a layer of silage at least 2 inches in depth will be removed each day after feeding has begun. This prevents a thin top layer from moulding. A dairy cow requires about 40 pounds of silage per day, and the following table is based on this amount. Forty pounds is also the average weight of a cubic foot of silage.

It is frequently advisable to cut down the average daily ration or to use silage together



with other feeds. With this thought in mind, and specially for dry weather feeding in summer, many farmers find it best to build two silos of moderate size instead of one large structure.

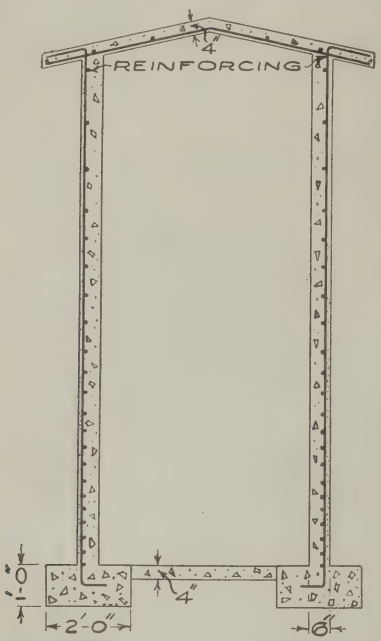
LOCATION AND FOUNDATION.

Locate the silo where it will be convenient for feeding. Usually it is joined to the barn by means of a chute and passage way with doors. Since the silo and its contents are heavy, it must be built on solid ground. The bottom of the foundation should go below frost line. The silo may, with advantage, extend 4 to 5 feet into the ground. Dig the pit large enough to allow for the thickness of the circular walls and a footing 2 feet wide.

MAKING THE FORMS.

In order to save lumber the concrete is poured into forms which can be moved up

as the concrete sets or becomes hard. These movable forms consist of two circular shells 3 to 4 feet high, so made that one fits within the other with space between for a 6-inch wall. The horizontal framework consists of 2- by 4-inch timbers cut to a circle, which are covered with sheet metal or wooden lag-



ging. Each piece must be long enough to provide for a 6-foot 3-inch length of the circumference of the circle as well as several inches for the lap or strap joints. The forms are raised by loosening them at the joints and setting them up again on the finished section of the silo.

MIXING AND PLACING THE CONCRETE.

Concrete for silos should be rich in Portland cement and should be put into the forms mushy wet. Mix it 1 part cement to 2 parts sand to 4 parts crushed rock. Four parts of clean pit or bank-run gravel may be used instead of the sand and rock. Measure all materials on the basis that 1 bag of cement equals 1 cubic foot. Many persons raise the concrete in buckets, but the work can be done more quickly and easily by using a horse together with a derrick or a well braced jib-boom fixed to an adjoining building.

BUILDING THE SILO.

The finished silo shown above is 15 feet in diameter (inside) and 36 feet high, of which 4 feet is below ground. At odd times all of the materials were hauled, so that there would be no delay when the work was started. After the pit was dug to solid clay, the concrete footings (2 feet wide and 1 foot thick) were placed and a 4-inch concrete floor was laid upon the natural clay bottom. The next day the forms were set up, the reinforcement placed, and the walls begun. These forms were 4 feet high and were made in eight sections 6 feet 3 inches long.

Since silage contains so much water, steel rods are necessary as reinforcement to withstand the pressure. To get the best results, this reinforcing should be placed exactly 1½ inches from the outside of the silo wall. Rods ⅜ inches in diameter and 10 feet long were used. The vertical rods were spaced 18 inches apart. Measuring down from the top of the silo, the horizontal rods were spaced as shown in the tables below:

SPACING OF HORIZONTAL REINFORCEMENT.

Feet distant from *top*.....	40–35	35–30	30–25	25–20	20–15	15–10	10–0
Spacing in inches.	6	7	8	10	12	15	18

The horizontal rods were carefully made into solid hoops by bending the ends so as to hook together. They were also wired to the inside of the vertical rods. (Complete plans for silos may be obtained free from any Portland cement company.) Two extra lengths were placed in the concrete 1½ inches above the door openings for removing the silage. These openings were made by a removable form (also cut to the circle), which fitted snugly between the molds for the silo wall.

The silo forms were filled with concrete and allowed to stand over night. The next morning they were loosened, raised and again filled. These operations were repeated daily until the side walls were finished.

With a 4-inch concrete roof, the silo is entirely fire- and repair-proof. The roof was built on a temporary wooden roof, which was entirely removed after three weeks. The concrete roof is cone-shaped with a rise in the center of 2 feet and a drip or overhang of 1 foot. One inch from the under side, this roof is reinforced with ⅜-inch rods laid like the spokes of a wheel and spaced 18 inches at the rim. Every other rod reached only half way to the peak of the roof. To hold the spokes in position so that the concrete could be forced between them and the temporary wooden roof, one ring of ⅜-inch

rods was wired to this reinforcing just over the side walls and another half way to the peak. These rods strengthen the roof greatly and must not be left out. Water-soaked weather boards were used to form the circular edge of the roof. An opening for the blower tube from the cutter was formed in the silo roof in the same manner as the doors in the side walls.

THE COST OF CONCRETE SILOS.

The list of materials required for this silo is given below together with a very liberal estimate of the cost of the same. The silo was built by five farm laborers in thirteen days. As a raise was made each day, the four extra days were spent in framing the forms, digging the pit and building the roof. The owner used gravel from his own farm pit instead of stone and sand.

BILL OF MATERIALS.*

Crushed rock, or screened gravel...40 cu. yds. at $1.10.	$44.00
Sand.....20 cu. yds. at $1.00....	20.00
Portland cement.....54 barrels at $2.50....	135.00
Reinforcing, 425 pieces of ⅜-inch x 10-foot rods .....1564 pounds at $0.02½...	39.10
	$238.10

* Consult local dealers as to prices.

The first cost of concrete silos may or may not be greater than that of the best of any other kind. The time is now at hand when farmers, like railroads and corporations, are considering the lasting qualities of buildings. Concrete silos need no insurance: they do not blow down or burn up. They never have to be painted or repaired. With other kinds of silos during their short lives, these expenses alone equal the first cost. Concrete lasts forever.

Bungling the Bungalow

THE bungalow appears to be the purple cow of architecture. Very few New York architects seem to have built one, and they would all rather see than build one.

"I don't know what I should do if I were asked to build a bungalow," a New York architect said to The Sun reporter, "but I now have no very definite idea of what such a building is. I know that the word comes from India and means a small house, usualy with a thatched or tiled roof. But the original significance of the word is slight nowadays for us. I at one time supposed that a bungalow had only one story, but I soon saw pictures of them with two stories. I supposed it was a low building stretching over the earth, but I later saw bungalows that looked like a Swiss chalet. Then I supposed they were made of wood, but I now hear that they are as a matter of fact built in all materials, from stone to brick. In fact, many of the so-called bungalows that I have seen seem to be, at the remotest, first cousins to an ordinary cottage. Perhaps a one-story cottage with its dominating dimensions, length and breadth rather than height, is what a bungalow has come to mean."

There are much more definite descriptions, however, of a bungalow than this architect admitted. Probably the fact that the bungalow was first built in the west, and in southern California has been produced in its best estate, has led eastern architects to be a little snobbish about it. They like to remain ignorant of something which, if not created, was at least brought to its highest expression of architectural style by their colleagues in the west. One definition of a bungalow that comes from this quarter is that the difference between the inside and outside of such a house must be reduced to a minimum. It will be seen, however, that this description applies more properly to bungalows built in a climate very different from our own.

As a matter of fact, the bungalow seems to be any kind of small, inexpensive villa, most frequently of wood, in which the architect makes a deliberate attempt at picturesqueness rather than the rigidity of outline that used to be characteristic of inexpensive houses.

Undoubtedly the houses built in India and other tropical countries for the use of foreigners who went there and built these modest structures to house them during their temporary stay were the prototypes of our suburban villa today that we call by the same name. Our bungalows since they migrated eastward from California have acquired characteristics which the houses they are modeled on could never have possessed. It was all very well for the builders of California bungalows to keep in mind the characteristics of these habitations, as they were built for warm climates. The plentiful supply of shade, the necessary arrangement for

the abundance of air and the imperative cheapness in construction could well be kept in mind. Apartments large but few in number, many doors and windows, the rather casual arrangement of all domestic details were almost as appropriate to the California home as they were to those put up in India, but they would never do in New York or any of the regions in which the bungalow is regarded as anything more than a home for hot weather.

The California bungalows, the pictures show, are strong in the suggestion of Japanese origin. That characteristic scarcely exists at all in the bungalows built on Long Island or anywhere about New York unless it is found in the height of the buildings and the lines of their predominating dimension. It might, of course, be easy to say that if the bungalow requires adaptation to our needs it is necessarily out of place in such a climate. There never was a time, however, when any convenience in architecture was willingly abandoned by people because it was not artistically appropriate. That the bungalow has come to stay as a popular form of summer residence nobody doubts. It seems just as certain that it will be used for winter residence also to the same degree that it is in California.

The great advantage of the bungalow is its cheapness and the certain element of picturesqueness that most of them possess. While it is of no importance in our climate except in the summer months that a bungalow should impart to its occupants the feeling that they are living out of doors, there is an undeniable lack of formality about residence in this form of house. While a brick bungalow would not seem to purists in style a very congruous structure, yet it would have an element of novelty and interest that a brick cottage probably costing not more than the bungalow did could never possess.

Then the bungalow is just as unpretentious as the cottage, although it is much more tasteful and indicates more cultivation in its occupant than a cottage ever would. It seems to be an element of every bungalow that it should never count very strongly on the landscape. In California these houses with their long low roofs and their deep piazzas seem to cling to the earth. They are as much a part of it in nearly every case as they are of the trees which surround them. Such effects are, of course, more strongly supplied when the material of the bungalows is native. Since native woods are chiefly used for building the California bungalows, they have this element of artistic merit over those of the east, in which all kinds of materials are used.

It is undoubtedly true that the bungalow type has not yet reached the consideration it buildings is so slight that architects of established position in the east do not care to trouble themselves about them. Some of the pictures show, however, how successfully these houses have been adapted to their sites, even in this neighborhood. They have proved to be a very appropriate crown for a seaside bluff, or they cluster gracefully on the top of a small hill. In such sites it is only necessary that the general lines of the bungalow type should be followed. Of course, a wooden bungalow seems much more appropriate for this region, just as brick might be regarded as the proper material for similar use in Pennsylvania and parts of Maryland.

But the bungalow is an imported style from which only the essential features can be drawn to suit actual American needs. So it is doubtful if the purist can find any grounds for criticism when details are left to the skill of the architect or the taste of the client. It is quite conceivable that a rough stone bungalow might fill the needs of this climate so long as it kept to the main suggestions that the bungalow has imported to American architecture. In these California houses it is customary to cover the walls and sometimes the roof with flowering roses or other plants suitable to the purpose, in order to make them seem as much as possible a feature of the atmosphere. It is inconceivable that a bungalow for this reason should require such treatment.

The bungalow therefore has come to mean for dwellers in this section of the United States the unpretentious substitute for the cottage. It is not expensive enough to reveal any very fine architectural treatment, but it can be made charmingly appropriate to its surroundings. It is convenient. In the majority of cases there are few steps to climb, and the arrangement of its rooms generally possesses a compactness and convenience, combined with a certain degree of formality, that older houses never possess.

Building Material Price List

Revised to Date.

*—Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red Cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

	Chicago, Corrected by J. H. Touchstone.	Omaha, Neb., Corrected by I. P. Hicks.	Southern Ontario, Corrected by F. O. Frantz.
Dimensions, Hemlock Lumber—	M ft. BM S 2 S	M ft. BM S 2 S	M ft. BM S 2 S
2"x4" to 8" up to 16', No. 1	$20.00	yp $26.00	h $24.00
2"x4" to 8" up to 16', No. 2	18.00	24.00	22.00
2"x4" to 8" 18 and 20', No. 1	21.05	27.00	26.00
2"x10" up to 16', No. 1	20.50	28.00	24.00
2"x12" up to 16', No. 1	21.50	30.00	25.00
2"x14" up to 16', No. 1	*	*	26.00
Each 2 ft. over 20 ft., add per M	1.00	1.00	2.00
Select stock as above, add per M	5.00	*	*
Exterior Finish, Etc.—	M ft. BM D 4 S	M ft. BM D 4 S	M ft. BM D 4 S
1"x3" to 1"x8", No. 1	yp $32.00	yp $45.00	wp $35.00
1"x16", No. 1	32.00	43.00	40.00
1"x12", No. 1	37.00	46.00	42.00
1¼"x3" to 1¼"x12", No. 1	45.00	48.00	45.00
1½" and 2" same as above	42.00	48.00	42.00
1" drop siding, No. 1	24.00	30.00	30.00
½" lap siding, No. 1	*	rdw 30.00	30.00
Enclosing and Fence Boards—	M ft. BM S 1 S	M ft. BM S 1 S	M ft. BM S 1 S
1"x4" to 1"x8", No. 1	yp $23.00	yp $25.00	wp $30.00
1 x8" to 1"x16", No. 1	23.00	24.00	h 24.00
1"x16", No. 1	*	24.00	24.00
1"x16", No. 2	*	22.00	22.00
Interior Finish, Flooring, Ceiling, Etc.—	M ft. BM D S	M ft. BM D 4 S	M ft. BM D 4 S
½", T. & G. Flooring, No. 1	yp $26.50	yp $38.00	wp $40.00
½", T. & G. Flooring, No. 2	*	34.00	wp 30.00
Add for ceiling per M	1.00	2.00	1.00
Add for partition per M	2.00	2.00	2.00
⅝"x4", Ceiling No. 1	22.00	30.00	np 30.00
	100 ft. run	100 ft run	100 ft. run
4¼" Moulded Casing	yp $1.52	yp $2.00	wp $2.00
4¾" Moulded Casing	1.68	2.50	2.50
7¼" Moulded Base	2.53	3.50	4.50
½"x9¼" Moulded Base	3.75	4.00	6.00
1½"x4½" Moulded Window Stool	2.12	3.00	4.00
Miscellaneous List—	Per M	Per M	Per M
Shingles, No. 1	rc $3.30	$4.00	bc rc $3.75
Shingles, No. 2	3.35	3.75	*
Shingles, fancy	W.C.	4.50	6.00
Lath, 4 ft., No. 1	yp 3.60	y 5.50	wp 5.00
Lath, 4 ft., No. 2	2.75	5.00	s 3.75
Pickets, 1"x3"x4' 6", dressed	35.00	30.00	*
Pickets, 1"x3"x4' 6", rough	*	*	*
	Piece	Piece	Piece
6"x8' Post split	Cdr $0.13	Cdr $0.25	*
8"x8' Post split	.17	.30	*
8"x8' Post whole	.66	.40	Cdr $0.30
6"x8' Post whole	.25	.35	.25
Hardware List—	Cw.	Cwt.	Cwt.
Nails, wire, common	$2.25	$3.00	$2.85
Nails, cut, common	2.10	*	3.00
Nails, wire, fine finishing	2.65	3.50	4.00
Sash Weights, cast iron	1.60	1.50	2.25
Tarred Felt Paper, best 2-ply	Roll $1.00	Roll $1.00	Roll *
Tarred Felt Paper, 3-ply		1.25	*
Red Rosin, Atlas brand		.90	$0.50
Red Rosin, durable brand		.75	.60
Black Neponset		*	2.50
Masons' Supplies—	Per M	Per M	Per M
Brick, blue, at kilns	*	*	*
Brick, blue, at kilns, No.	*	*	*
Brick, blue, at kilns, No. 2	$7.50	*	
Brick, white, delivered, face	7.00	*	*
Brick, red, delivered, backing	7.00	7.50	*
Brick, delivered, dry pressed	18.00	18.00	$17.00
Brick, vitrified, dry pressed	*	24.00	*
Lime, best gray	bbl. $1.30	bbl. $1.25	bbl. *
Lime, best white	1.40	1.25	1.80
Cement, Portland	.95	1.85	*
Plaster, calcined	2.40	1.80	bbl. $2.50
Hair, 8 lb. per bush	.25	.25	*

Plaster (patent) $6 per ton. White Rock $11.00 per ton.

NOTE—While these figures are approximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

Book Notices

Notice.—All books noticed in these columns may be obtained from this office at Publishers prices. All postage or express prepaid. (Money and address must accompany all orders.)

Cornice Work Manual. An exposition of metal cornice work in all its branches, compiled from files of The American Artisan, by Sidney P. Johnson, and prepared for the use of practical workers in sheet metal. 184 illustration, 234 pp., 5x8 inches, printed on fine paper of good wearable quality, and strongly bound in red buckram. Published by The American Artisan Press, 1912; 537 South Dearborn street, Chicago, Ill. Price prepaid, $3.50.

This work is intended to be, and is, one of the most useful and most instructive works ever prepared for the guidance and direction of the actual worker in sheet metal of any kind. It contains a large number of working diagrams, scaled details, with full directions for laying out and cutting sheets for a large number of intricate and elaborate cornices, and ornamental work of many kinds. It is seldom so much practical matter can be found in a work of this kind and size, written up in so terse and vigorous a style as is presented in the manual before us. Mr. Sidney P. Johnson was just the right man to be selected to prepare this work, as he is well up on the subject of sheet metal work of all sorts and speaks directly from the workbench, in good understandable workshop language. We bespeak for this work an extensive circulation.

Concrete Workers' Reference Books Nos. 8 and 9. These manuals are in continuation of the series being gotten up for the Norman W. Henley Publishing Company, and are written by A. A. Houghton. We have noticed in these columns some six or seven of this series in previous issues and we find they do not lose their interest or practical value as they multiply. Each little volume is filled with excellent instructions and directions for the use and management of concrete on the special work to which the book is devoted. The two volumes under present consideration are No. 8, "Concrete Bridges, Culverts and Sewers," and No. 9, which is devoted to "Construction of Concrete Porches," and both volumes are well illustrated with working designs and diagrams, each of which is fully described and explained. Directions and rules for mixing and proportioning the various ingredients required to properly make the necessary concrete for each particclar class of work are given, thus making these manuals of the most possible use to the working contractor, foreman or laborer. The little books are published by the Norman Henley Publishing Company, 132 Nassau street, New York, N. Y. Price of single number is 50 cents, post free, and may be obtained singly or by the whole series at the same rate.

House Wiring. A treatise describing and illustrating up-to-date methods of installing electric light wiring. Intended for the electrician, helper and apprentice. It aids in solving all wiring problems and contains nothing that conflicts with the rulings of the National Board of Fire Underwriters. It contains just the information needed for the successful wiring of a building of any kind. By Thomas W. Poppe, electrical engineer. Stiff paper covers, 74 illustrations, over 100 pp. Published by the Norman Henley Publishing Company, 132 Nassau street, New York, N. Y. Price 50 cents. This is a most useful and practical little work.

Brazing and Soldering. Being a series of practical papers suited to the requirements of tinkers, sheet-metal workers, plumbers, gasfitters and practical electricians. By. James Hobart, M. E. Over 50 pages, illustrated, strong paper covers. Published by the Norman W. Henley Publishing Company, New York. Price 25 cents. This little work should be in the hands of every worker in metals, as it will—at some time or other—prove a good aid and help the worker to get over some difficulty with which he is sure some day to be confronted, and then "a friend in need will be found surely a friend indeed."

Building Trades Interests in the Courts

Prepared for the National Builder By GEORGE H. MURDOCH, Newark, N. J.

Recovery of a judgment against the debtor in a suit at law does not waive the right to a lien, nor bar an equitable action to enforce the same.—Erickson v. Russ, 129 N. W. (N. D.) 1025.

In the absence of statutory requirement, the lienor is not required to exhaust his remedy at law before resorting to the security of his lien.—Erickson v. Russ, 129 N. W. (N. D.) 1025.

Right to forfeit a building contract does not carry right to refuse to pay for labor and materials, not conforming to the contract, but received and beneficially used.—Voigtmann v. Wilmington Trust Bldg. Corporation, 78 A. (Del.) 920.

A person who purchases premises upon which there is a valid mechanic's lien cannot compel the lienor to exhaust his legal remedies against the original debtor before resorting to the security of his lien.—Erickson v. Russ, 129 N. W. (N. D.) 1026.

Intestate was not guilty of negligence, as a matter of law, in not knowing that the wires strung over a building on which he was working were electric wires, or that they were not properly insulated.—Braun v. Buffalo General Electric Co., 94 N. E. (N. Y.) 206.

Where the supports for a scaffolding were planned and constructed by employes, the master at common-law was not liable for the death of an employe caused by the collapse of a support—Gombert v. McKay, 94 N. E. (N. Y.) 186.

Where the furnishing of a safe place to work depends upon inspection and test, these must be done with such intelligence and skill as the nature of the work and the consequence of injury to others may reasonably demand.—White v. Newborg, 94 N. E. (Mass.) 269.

Failure to file a mechanic's lien statement within ninety days from completing work or delivering the last material, as required by statute, cannot be excused because a contract was terminated by the other party before full performance.—Voigtmann v. Wilmington Trust Bldg. Corporation, 78 A. (Del.) 920.

Where a servant is directed by a master to inspect, test, and repair wooden brackets for stagings, he acts in such work towards the other servants as a representative of the master, and his failure to exercise reasonable care in so doing is negligence, for which the master is liable.—White v. Newborg, 94 N. E. (Mass.), 269.

An agreement by the owners of buildings under construction to extend the time for their completion beyond that fixed by the contract, on the promise of the contractor to have them completed within a further time stated, was without consideration, and constituted no defense to an action for breach of the contract by failure to complete them by the time provided for therein, where the agreement did not induce the default.—Empire State Surety Co. v. Hanson, 184 F. (U. S.) 58.

Labor Law (Consol. Laws, c. 31) §§ 18, 19, absolutely forbids employers from furnishing improper scaffolding, and any employer who personally or by another furnishes a defective scaffolding is liable therefor, but the common-law defense of assumption of risk or contributory negligence is available because the statute only supersedes the common-law doctrines in so far as it opposes them.—Gombert v. McKay, 94 N. E. (N. Y.) 186.

Where the brackets used to support a staging were ones from a number that the master had directed to be patched up, and out of which some were rejected after test, and others repaired, and of which all were necessarily in use when a staging upon which the plaintiff was standing broke, the case is not one in which the servant might be guilty of contributory negligence in selecting appliances from a sufficient stock.—White v. Newborg, 94 N. E. (Mass.) 269.

A building contractor entered into a new contract on other terms at the request of the owner, who desired a bond for the performance of the contract. The bond given made the original contract a part thereof. There was no mutual mistake, and the surety did not intend to secure the new contract. The building was constructed under the new contract. Held, that the surety was not bound for the faithful performance of the new contract.—Kracht v. Empire State Surety Co., 113 P. (Wash.), 773.

Where a building contract provided that no changes or alterations should be made in the work shown or described in the drawings or specifications, except on written order of the architect, and, when so made, the value thereof should be computed by the architect, the contractor is not entitled to compensation for extra work unless ordered in writing by the architect, and the value thereof computed by him, except where the architect acts arbitrarily and in bad faith in computing or refusing to compute the value of such extra work.—Taub v. Woodruff, 134 S. W. (Tex.) 750.

An employe who deliberately approved the plans devised by fellow employes for the construction of supports for a scaffold, and who assisted in constructing the supports in accordance with the plans, and who knew the materials and the manner of construction, and who knew the uses to which the scaffold was to be put, and the risks connected with a construction insufficient in strength of materials or defective in manner, assumed the risk of injury caused by the collapse of a support, causing the scaffold to drop.—Gombert v. McKay, 94 N. E. (N. Y.) 186.

A provision of a bond given by a building contractor to secure the faithful performance of a contract for the construction of certain buildings, and which provided that they should be completed by a certain date, requiring the obligees to notify the surety "immediately after" any default by the contractor which might create liability on the bond, was complied with by service of a written notice, four days before the expiration of the time for completion of the buildings, that they would not be completed within the time, which was at that time apparent from their condition.—Empire State Surety Co. v. Hanson, 184 F. (U. S.) 58.

Where a subcontract required the subcontractor to perform his work in accordance with plans and specifications prepared by an architect, written declarations made by the architect during the progress of the work as to its sufficiency, and his decision that plaintiff had performed the work satisfactorily, and in accordance with the plans and specifications, would be evidence for plaintiff in an action for the price.—Lautz Co. v. Glenn, 183 F. (U. S.) 666.

Trade Review

A WOODWORKERS EXPOSITION.

The cut at the head of this page might be taken for one of the exhibition halls of any of our recent world's fairs, but it is only one of the three floors of the new building of the Chicago Machinery Exchange, located at 1217 to 1225 Washington boulevard, Chicago, Ill., and devoted exclusively to woodworking machinery.

A trip through this three-floor building would show the contractor and builder practically every high grade machine for the economical production of the highest class of woodwork. There are rows of combination woodworkers, taw-tables, band-saws, planers, jointers, tenoners, moulders, carvers, dovetailers and lathes for every purpose. There is also a side line of trucks, benches, and accessories, such as the miscellaneous equipment for the various machines, including saws, cutter-heads, groovers, power borers, etc. Everything is found which a full-grown planing mill might require, or the smallest contractor use in building cottages and bungalows.

The above cut shows only one floor of the building. Another, equally large, contains even a greater number of machines, while an entire floor is given over to repairs and rebuilt machines.

Whether from financial reasons or because a man has only a limited amount of work for a machine, a rebuilt machine will usually fill the bill to advantage, and at a considerable saving in first cost. As rebuilt by the Chicago Machinery Exchange, the machine is first stripped down to the bare frame, and then carefully reassembled, trued-up, shafts turned, boxes lined, and when finished the machine is for all practical purposes a new machine.

At the time the writer visited the place, several large sanders were going through the rebuilding process, and the care the workmen were taking would seem to be one of the reasons why this company has steady customers who add to their plants as conditions require and circumstances permit.

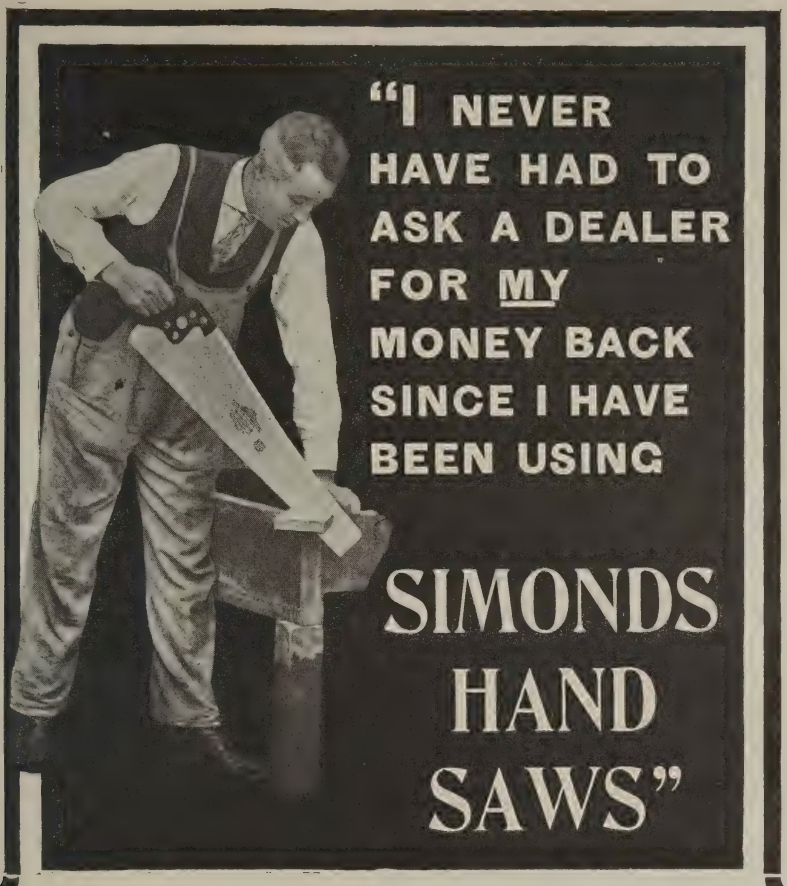
In their stock of new and rebuilt machines are found so many high grade machines that the purchaser can compare the various makes, and his selection, not from a catalogue, but from the actual machines, will be the identical machine of which he approves.

The sales of the Chicago Machinery Exchange are not confined to this country alone. Machinery has been shipped to Australia, Germany and many other foreign countries.

Among the manufacturers whose machines were seen on the various floors we noted a number whose names are familiar to the readers of The National Builder. We especially noted that the company handles goods made by Baxter D. Whitney & Son, Hermance Machine Co., McDonough Manufacturing Co., Falls Machine Co., L. G. McKnight & Son Co., C. O. Porter Machine Co., Beach Manufacturing Co., M. L. Andrew Co., Maddox Machine Co., C. Mattison Machine Works, E. B. Hayes Machine Co., Greaves, Klusman & Co., Jackson & Church, Mereen-Johnson Machine Co., Tannewitz Works, Chicago Line, Advance Machinery Co., Smith & Phillips Co., W. A. Heath Machine Co., Sidney Tool Co., Defiance Machine Works, Covel Manufacturing Co., C. H. & E. Manufacturing Co., American Saw Mill Machinery Co., Sam'l J. Shimer & Sons, Monarch Machinery Co., Atlantic Engine Co., and Huther Bros. Saw Manufacturing Co.

The Chicago Machinery Exchange finds that their lists of rebuilt machines change so rapidly that they are obliged to get out frequent additions to their catalogues. Their own printing plant is busy at this, and we are advised that contractors, builders, mill-men and others interested in woodworking machinery will be placed on their lists. This gives everyone an opportunity to secure bargains when they are in the market for machinery, either new or rebuilt, as well as secure material of every-day interest, and the special offers made to the readers of The National Builder.

Those of our readers who come to Chicago are urged to visit this establishment, and see for themselves the advantages of the best machinery for their shops and on their jobs.



THE REASON for this confidence is that the Simonds Saw is a manufacturer's own brand Hand Saw. We cannot change our name on our brand for any little reason, but must stick to it. Therefore we are building the Simonds reputation into the Saws we are making.

There is every reason to believe that a Carpenter will get the best satisfaction if he owns a full set of Simonds Saws. We make several styles, Hand, Rip and Panel Saws. One of our best sells for $2.50 in 26 in. length.

At Most Hardware Dealers

Or, write us direct.

Simonds Manufacturing Company

Fitchburg, Mass.	Chicago, Ill.	Montreal, Que.
New York City	New Orleans, La.	Seattle, Wash.
Portland, Ore.	San Francisco, Cal.	London, Eng.
Vancouver, B. C.	Lockport, N. Y.	St. John, N. B.

GOOD BUSINESS FOR THE ARCHITECT AND BUILDER

IT pays the Architect to **write** Green Label Varnishes **into the contract.** It pays the Contractor and Builder to **make sure** that genuine Glidden quality goes on the **job.**

Not **"or equivalent"**—for there is **no** equivalent.

It's this matter of proper finishing—of beautiful permanent protection of the woodwork and floors that insures the future satisfaction of the owner—and reflects **lasting** credit on the man who wrote the specifications and the man who carried them out.

So it is good business to go by the Green Label—**always.**

The Glidden name has stood for **quality** varnish for nearly half a century. We made our standard the highest—and **kept** it there.

We do not know "all there is to know" about Varnish—never expect to. But we've been busy learning all the time —**Perfecting Good** Methods, supplanting **Good** materials with **Better** ones, which we search the world to secure, regardless of cost—and training here, under Glidden guidance, a corps of expert varnish makers and chemists—every man of them a specialist—the greatest varnish organization in America.

GLIDDEN'S GREEN LABEL

Varnishes of Vitality

are full of life, elasticity, durability. The Glidden way of perfect blending and refining—of long time ageing—means a product of perfect **Uniformity.** Glidden Varnishes dry just quickly enough but not too quickly, and set without dust. They bring out **all** of the natural beauty of the wood. They are proof against **Hard Knocks** and **Heel Nails.**

There's Quality in Every Drop

Five splendid specialties—each grade has its special purpose:

M. P. Durable Exterior - -	$4.00 Per Gallon
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Velvet White Enamel - -	5.00 Per Gallon
Superior White Enamel -	5.00 Per Gallon

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HERRICK OUTSIDE ICING.

The house plan on the supplement in this issue shows the outside icing arrangement which has become so popular with architects and property owners.

The great convenience of outside icing is appreciated especially by the house wife. Being appreciated by her—it is now one of the first things she looks for in a house plan, or when buying a home. Instead of the old way of waiting around all day for the ice man to track over the clean kitchen floor and deposit the ice in the box, the house wife can go away and know that the ice man is placing the ice in the box, simply by opening the little door in the side of the house and chucking in the ice. Of course, this arrangement means also that no other part of the ice box is accessable to anyone on the outside.

It is really such a simple matter that outside icing can be easily planned and arranged for in either new or old residences. After deciding the most convenient place for outside icing, the next thing is to be sure and specify and buy a Herrick Refrigerator.

Herrick Refrigerators are manufactured by the Herrick Refrigerating Company, Waterloo, Iowa. Booklet No. 41, containing blue prints that are valuable to every architect, contractor and builder will be sent on request. This booklet will show why the Herrick Refrigerators have the best possible construction, circulation and insulation, whether it is from their varied stock or built to conform with the architect's specifications.

This information is especially desirable to have in connection with THE NATIONAL BUILDER's June house plan and will be gladly sent on request.

WASHINGTON FIR AND RED CEDAR.

Contractors and builders living in the central and eastern states periodically become alarmed as various species of wood become practically extinct for general building purposes. The high prices they are obliged to pay for what is practically second grade has led many to ask if there were not woods available, at reasonable prices, in sufficient quantities and having greater durability than the poorer grades they were obliged to use.

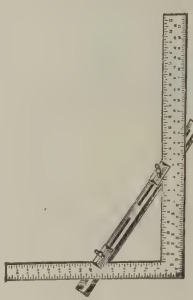
The Hewitt-Lea-Funck Company, 629 First avenue, Seattle, Wash., advise us that they have in their extensive reserves billions and billions of feet of the finest grades of fir, red cedar, and other woods suitable for building purposes. So large are these reserves that they own and operate their own railroad to bring the logs to their mills, and distribute the finished product for shipment. Their mills are favorably situated for shipping on seven trans-continental railroads, which, with the transportation via Puget Sound, gives them excellent facilities for delivering materials to any part of the country.

In many parts of the country western fir is largely used for framing, its strength, straight grain, and durability making it exceedingly valuable for this purpose, while the beautiful finish which it takes places it in the front rank of American woods.

Red cedar lasts so long that some say it lasts forever. An ordinary lifetime is too short to gauge the length of time red cedar shingles have been known to be in service.

Contractors and builders should investigate carefully the lumber question. When a client claims an estimate is too high, write to the Hewitt-Lea-Funck Company and get their prices on the lumber and millwork complete. They are able to give excellent advice on the subject.

STAIR WORK MADE EASY.



No part of the joiner's work is of greater importance than stair building. The work must be laid out accurately, and the use of the best tools and appliances are not only a convenience, but a necessity.

It frequently happens that the stair-builder has to deal with unusual fractions in his work. The rise is seldom exactly an even number of inches, although it may be within one-seventeenth of an inch of it. A little inaccuracy will give the steps an awkward appearance, and often a dangerous condition.

The Starrett Patent Stair Gage was designed to provide a suitable appliance for laying out strings, steps and bevels in stair work as well as in rafter framing, and other similar work. The cut shows the gage applied to a steel square as in ordinary use.

The L. S. Starrett Co., Athol, Mass., describe this appliance fully in their catalogue No. 19M, which contains a very complete list of standard and special woodworkers' tools, appliances and machines.

TOOLS AND HARDWARE.

There has been a great improvement in the grades of hardware used for all classes of buildings during the last few years. While formerly it was possible to obtain cylinder locks which gave security, it is now customary to use locks of this character on all classes of buildings and these locks can now be obtained in a wide variety of styles to suit individual requirements and to match various ideas in decoration.

Why the Architect and Builder Specify Alabastine

Because he wants to give his clients the best and he knows Alabastine is best. He knows that not only for the home, but for churches, school houses, opera houses and all public buildings, Alabastine is the logical and suitable material to use.

Why the Property Owner Wants Alabastine

Because he knows from his personal experience or the experience of friends that Alabastine is the most artistic and dependable material that he can use on his walls.

He knows that Alabastine in the hands of a capable workman will enable him to carry out any individual decorative idea, harmonize the colors with rugs, draperies, etc., and give him an original and truly artistic effect.

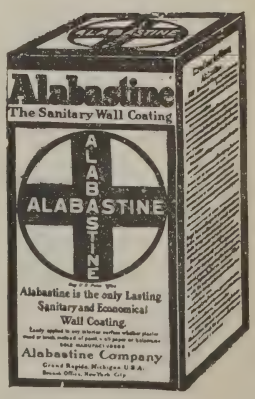
Very few people can afford to have special designs of paper made for their rooms, but any one can get an absolutely original design in Alabastine decorating.

Why the Large City Decorators Use Alabastine

Because they know that if Michael Angelo were on earth today carrying out his famous frescoes, he could not procure or produce a better water color medium for his work than Alabastine. So fine is Alabastine in texture that water color artists are able to take the regular packages and produce beautiful floral and landscape effects. The decorator wishes to please his client by giving him what he desires and that material with which he can produce the best effects, so he uses and recommends Alabastine.

Why the Small-Town Painter Is a Friend of Alabastine

If a customer wants her rooms done in water color, she wants them done in Alabastine. Samples are furnished the painter showing a complete line of beautiful color effects and miniature stencils from which she can select the exact colorings and decorative effects she may desire and the painter knows exactly how to produce and carry it out. He knows also that he can get any kind of special help by writing the Alabastine Company.



We also manufacture a special interior cold water paint sold in barrels for factories, warehouses, garages, etc. Used in immense quantities, always with satisfaction as to quality and price.

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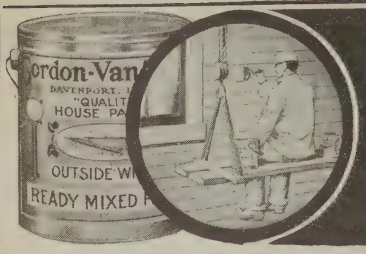

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618 Federal Street, Davenport, Iowa
America's Largest Independent Building Material Plant (194)

Fully as great an advance has been made in woodworking tools. Hammers are made of better steel and better hung. Chisels will hold their edge longer and cut easier, bits will bore through the hardest wood without difficulty, and other tools have been similarly improved.

The plane is easily in the first order of tools. The surface which it leaves is generally the finished surface on the material, so every part of the plane must be right. The line of planes manufactured by Sargent & Co., 1151 Leonard street, New York, are designed to do the highest grade of work. The numerous styles and sizes are adjustable to suit various conditions, classes of work and material, and embody original features of interest.

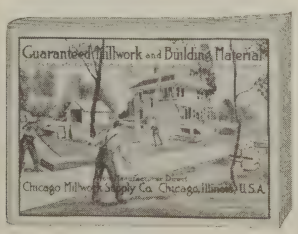
The Sargent Tool Book describes in detail the complete line of planes and other tools made by this company. We understand a request from NATIONAL BUILDER readers is all that is necessary to obtain a copy.

GUARANTEED MILLWORK AND BUILDING MATERIAL.

Up to a few years ago, and for years back, the Chicago Millwork Supply Company advertised in THE NATIONAL BUILDER. Their materials and method of doing business were well liked by their many customers among the readers of this magazine. Old subscribers

will be glad to welcome the Chicago Millwork Company back, and new readers will also be pleased to know where they can get guaranteed millwork and building materials at what is claimed to be very reasonable prices.

Whether a man builds but once, or makes



building his business, only first class, dependable materials should be used.

Catalogue No. 8301 issued by the Chicago Millwork Supply Company is a very attractively gotten up book of over 175 large pages, which lists practically everything except brick and cement for use in all styles and classes of houses, residences, stores, etc. From the basement windows to the shingle or metal tile roof, everything is listed at extremely reasonable prices. We note especially such items as artistic designs in leaded glass, mouldings, ready roofing, sheet metal work, hardware, craftsman doors and trim, besides page after page of bargains in paints, gasoline engines, cement machinery, cedar chests, furniture, massive buffets, china closets, grilles, etc.

Besides being a complete catalogue, there is also a vast amount of building information, which will materially aid the contractor, builder or owner in the preparation of plans and the selection of the proper materials to go into the building.

The Chicago Millwork Supply Company, 611 South Dearborn street, Chicago, Ill., has a plan book on modern homes practically ready for distribution, and it will be well for contractors and builders to have their names on file so they will get one—also one of the new catalogues.

HARDWOOD FLOORING.

Every year more attention is given to the finer finish in our homes. Where a few years ago it was customary to find hardwood flooring in only the highest priced houses, now no building of any pretention is considered up to date unless the entire floor is of hardwood, with a perfectly smooth surface to take a high finish or polish.

There are a number of factors to be considered in the production of high-grade flooring. There must be an adequate supply of material so that the lumber is not run through the mill too green, and yet there is the possibility if going to the other extreme when the facilities for manufacturing are not in proportion to the supply.

The plant of Wilson Bros., Ltd., Front street, Collingwood, Ont., is exceptionally favored for the manufacture of hardwood flooring and other building materials. Their supply of material is assured by careful conservation of their immense forest reserves, the cut never exceeding the annual growth, and their plant is arranged with modern machinery, kilns, storage sheds, etc., of ample capacity to carry on their work with mechanical economy. Being located directly on Georgian Bay, as well as on the Grand Trunk Railroad, they are able to reach all parts of Canada, as well as many sections of the United States, with a very low freight rate.

While it might be thought that freight rates, duties, etc., would raise the cost of Wilson Bros.' flooring to a prohibitive price, many of our readers are located where it will be an advantage to learn more of the Wilson method of making flooring, and we believe the Wilson Lumber Company is in a position to give reliable advice regarding the use of the materials they manufacture.

IT MAKES NO DIFFERENCE WHERE YOU LIVE

2×6-16 #1 COMMON FIR 16¢ EA.

2×4-16 #1 COMMON FIR 11¢ EA.

CLEAR FIR MOULDED BASE 2¢ PER LINEAL FT.

CASING CLEAR FIR, 1¼¢ PER LINEAL FOOT

MAKE MORE MONEY!

IF YOU ARE BUILDING HOUSES, BARNS, OR DOING CONTRACT WORK OF ANY KIND, BUY LUMBER, MILL WORK, HARDWARE AND PAINT DIRECT FROM THE MANUFACTURER. CUT OUT THE MIDDLEMAN. SAVE HIS FIVE PROFITS. WE ARE OWNERS OF BILLIONS AND BILLIONS OF FEET OF FIR AND CEDAR. WE OWN OUR LOGGING RAILROAD, OPERATE OUR OWN MILLS, AND NOW WE OFFER YOU THE PRODUCT OF THESE UP-TO-DATE MILLS AT THE MANUFACTURERS PRICE.

COMPLETE HOUSE BILLS LOADED IN ONE CAR WILL SAVE YOU FROM 25% TO 50%. OUR SERVICE WILL BRING YOU GUARANTEED LUMBER, MILL WORK AND SUPPLIES.

PRICE: YES, THE PRICE IS RIGHT, FOR WE CUT OUT THE WHOLESALER, JOBBER, TRAVELING MAN, COMMISSION MAN, AND THE EXPENSIVE, PROFIT-LOVING RETAIL DEALER.

SHIPMENT: VERY PROMPT, BECAUSE WE CARRY A LARGE STOCK. SEVEN TRANSCONTINENTAL RAILROADS AT OUR DOOR. SHIPMENTS GO THROUGH IN A HURRY. ABSOLUTELY NO DELAY.

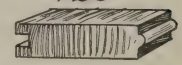
QUALITY: WE GUARANTEE BETTER GRADES THAN YOU CAN GET FROM YOUR LOCAL DEALER. THE AVERAGE MANUFACTURER SELLS TO WHOLESALERS. HIS INTEREST STOPS AT THIS POINT. WE GIVE YOU THE BEST TO BE HAD, BECAUSE WE WANT YOUR FUTURE ORDERS. WE MANUFACTURE OUR OWN LUMBER FOR YOU.

YOU KNOW RED CEDAR LASTS FOREVER, AND YOU KNOW THE LONG AGE OF FIR, AND THE BEAUTIFUL FINISH IT TAKES.

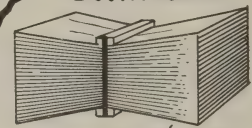
LONG TIMBERS, SHINGLES, LAPSIDING

STRAIGHT OR MIXED CARS OF GENUINE WASHINGTON RED CEDAR SHINGLES, AND OLD-FASHIONED NEW ENGLAND LAPSIDING, OR CLAPBOARDS, SURFACED ON TWO SIDES. EDGE GRAIN FIR FLOORING, CEILING, PARTITION, CASING, BASE AND FINISH.

EDGE GRAIN CLEAR FIR FLOORING $28.00



WASHINGTON RED CEDAR SHINGLES



CLEAR 5/2 = $2.13
EXTRA XXXX = $1.77
CARLOAD PRICE

SEND FOR OUR FREE LIST OF BUILDING MATERIAL, QUOTING PRICES PREPAID TO YOU. TEAR OFF THE COUPON, AND MAIL TODAY

Clear Washington Red Cedar Bevel Siding = $2.35 per 100 ft.

HEWITT-LEA-FUNCK CO.,
629 FIRST AVE.
SEATTLE, WASH.

Please send me your free lumber and building material list, quoting prices, freight paid to my station.

NAME _____

ADDRESS _____

OCCUPATION _____

Hewitt-Lea-Funck Co.

HIGH IN QUALITY — LOW IN PRICE — FIRST IN SHIPMENT

629 First Ave. Seattle, Wash.

Please mention NATIONAL BUILDER when writing to advertisers.

A REAL PORTABLE WOODWORKER.

The C. H. & E. Manufacturing Company, 319 Mineral street., Milwaukee, Wis., was one of the first, if not really the first, to manufacture what is commonly called the portable woodworker. The early files of THE NATIONAL BUILDER contain their advertisements, and the continuous advertisements of this company in THE NATIONAL BUILDER is an indication of the support which they have received from our readers.

The construction of portable combination woodworkers is varied. Considerable additions are being made and various portions refined in construction, until now these machines are really sufficient to do all the work required on an ordinary job and in the shop, such as sawing, planing, plowing, mitering, cutting, moulding, boring, sanding, sharpening tools, etc. The various attachments which have been added from time to time have increased the scope of the woodworker and materially increases the individual output of the workmen. The addition of power, such as gasoline or electric motors, makes these woodworkers a most valuable part of a contractor's equipment.

The C. H. & E. Manufacturing Company has already introduced a number of the novel attachments now found on many other combination woodworkers. Their last machine, that is, the 1912 model, known as the No. 3 Saw Rig, reaches practically the limit of portability. The frame of this machine is so constructed that it is easily moved from place to place. The skids are longer than are absolutely required for a foundation, and on one end these are shaped into handles, while on the other end a pair of truck wheels are attached. When in position these wheels are off the floor, but by tilting slightly by means of the handles the machine is practically on a truck and can be moved from place to place.

The C. H. & E. Manufacturing Company believe it is in the interest of every contractor and builder to have the attractive folder of their No. 3 Saw Rig, as well as the special price to NATIONAL BUILDER readers.

FORTY YEARS IN THE HARDWARE TRADE.

The Orr & Lockett Hardware Company of Chicago celebrates its fortieth anniversary May 27th. Keeping pace with the city of its birth, this concern has grown from a very small beginning to be the foremost institution of its kind in the world. No firm is more intimately associated with Chicago's wonderful progress, or holds the confidence and good will of architects and builders to a greater degree than does this one.

Today when every detail about a building is given such careful consideration, it is hard to realize that at the time this company was organized, practically no attention was being paid to the ornamental or artistic possibilities of builders' hardware; and that even in some very costly buildings there would be a grotesque contrast between the expensive wood and marble used in their construction and the hardware.

The influence of this aggressive firm not bound by tradition nor hampered by prejudice, was immediately felt. Designs in hardware which compelled attention from both the stand-point of artistic value as well as practical worth were submitted to the building fraternity. The pre-eminent merit of these designs, vincing, and their adoption created a standard which has made Chicago famous for the quality of hardware used on her public and business buildings and fine residences.

Mr. Lockett's innovations as shown in the following well known Chicago buildings, mark distinct periods in the history of builders' hardware. Statuary bronze hardware was introduced when the Western Union Telegraph building was erected in 1886. Cast iron made black and rustless by what is known as the Bower-Barff process was first used for builders' hardware on the Rookery building in 1887. The lower floors of the Monadnock Block were furnished with the first aluminum hardware ever manufactured. Hardware made of solid German silver was first used on the Marquette building, which is the most expensively furnished office building in the world.

The new Northwestern Terminal Station was equipped by this company under the personal supervision of Mr. Lockett, who gave it the benefit of his lifetime experience. Chicagoans are proud of the fact that the hardware in this building is superior to that used on any railway station in the world. It is all of special design, made extra heavy of solid brass with an antique finish. All the special work and much of the hardware was made in the Orr & Lockett shops.

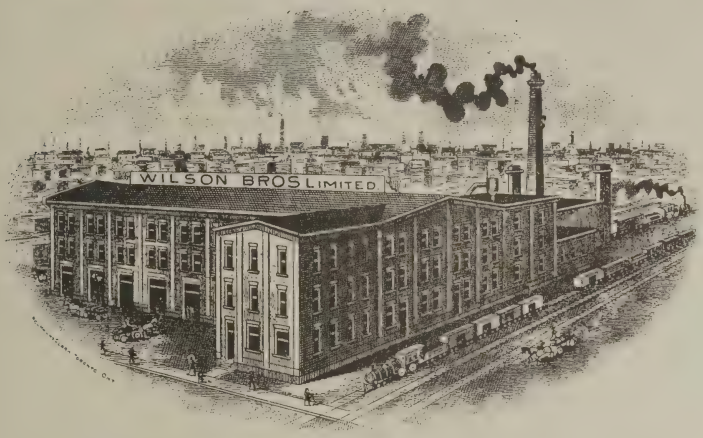
To sum up, this firm has equipped practically all the better buildings erected in and around Chicago since 1872. Beginning with the Union Passenger Depot, built the year they started business, to the new Northwestern Station just finished, the list includes such well known examples of modern architecture as the Auditorium, Congress Hotel, New University Club, Hotel La Salle and the Blackstone Hotel. The activities of this firm extend to all parts of the country, and include the equipping of the State House in Jackson, Mississippi, the Burlington station in Omaha, the government buildings of the Norfolk Navy Yards, and many other well known structures.

The cooling room, refrigerator, restaurant and market work has been under the direct supervision of Mr. C. B. Orr. This department is famous and has to its credit such well known installations as the Hotel La Salle, Sherman House, Blackstone hotel, New University Club and hundreds of other large and small plants all over the country.

The complete stock found in the different retail departments of this company are unequaled. Supplies of all kinds and every imaginable tool and device used by the various building trades is always kept on hand. Their cutlery stock is famous. Some idea of the size of the stock this firm carries can be

For Canadian Readers

of the National Builder—Only



This illustration does not show you the largest factory in the world. But it does show you a plant that is unusually well equipped—where only experienced workmen are employed—where the highest grade materials are used—The home of

Wilson Bros., Limited, Flooring

The fact that we are the oldest and largest manufacturers of **Maple Flooring** in this country should give you confidence to specify and buy not only **Wilson Bros., Limited, Maple Flooring,** but also **our Beech, Birch** and **Oak Flooring. Wilson Bros., Limited, Flooring** means a carefully kiln dried and manufactured article. It is straightened, hollow-backed, bored, end matched, steel polished and bundled.

BESIDES OUR FLOORING WE SPECIALIZE ON

Veneered Doors and Hardwood Interior Finish

TO DETAIL—WE ALSO MANUFACTURE DOORS, SASH AND PINE FINISH

CANADIAN READERS OF THE NATIONAL BUILDER

We have the right kind of plant, material and workmen—we are located in your own country, where we can give you the quickest shipments and best prices considering the high quality of our goods—so let us become acquainted. You can make money by specifying **Wilson Bros., Limited, Flooring and Interior Finish**—besides pleasing your customers—so write us now—we want to figure with you on your next job.

Wilson Bros., Limited

First Street **Collingwood, Ontario**

judged from the fact that it is comprised of over 100,000 different articles.

This company has made but four changes in its location in forty years, which in a rapidly growing city like Chicago, is quite remarkable. They moved to their present location, 14-16 West Randolph street, in 1893, and occupy the entire building, consisting of five floors and basement. The Orr & Lockett factory where their refrigerators, cooling room and market fixtures, and manual training outfits are manufactured is located at 22nd and Jefferson streets.

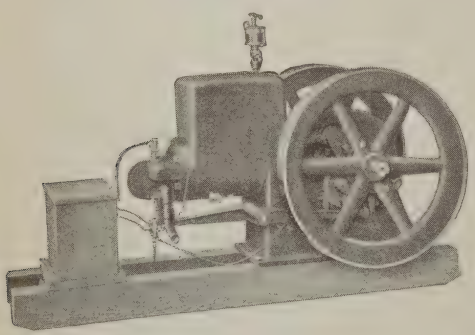
THE STANDARD ENGINE.

The Standard Portable Saw Rig is equipped with a high class engine of the Standard Gas Engine Company's own design and manufacture, having special features making it particularly adaptable to the services demanded of it. By reference to the illustration, it will be observed that its neat, but large, sturdy design, embodying such excellent features as a large water hopper for cooling cylinder; frost-proof cylinder; main bearings at 30 per cent angle; automatic oiling arrangements for crank and piston pins; detachable cylinder head; removable valve cages; gasoline tank in base of engine; oil guard over crank and high-class jump spark ignition.

The manufacturers state that this engine is unusually easy to start and is absolutely dependable for all purposes. It will do the work of five men. It is non-tiring and runs just as fast late in the afternoon, as it does in the morning.

By taking out four bolts at base of iron pedestal the entire woodworking outfit may be removed, leaving a general purpose engine, entirely complete on skids.

The large belt pulley is fitted on extended crank shaft; therefore it is easily removed and



Standard Gas Engine

any other size pulley attached without difficulty. The idea of taking out a few bolts and making a general purpose engine, entirely complete on skids and without the saw part, is exclusively a Standard feature, and one that is appreciated by contractors and builders.

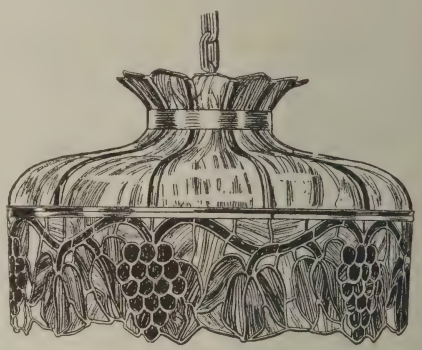
The Standard Portable Saw Rig comes to each buyer entirely complete, ready to run, with the following: One ten-inch rip saw (fitted); one ten-inch crosscut saw (fitted); one dado head, one-half-inch or seven-eighths-inch, as desired; one jointer head with four two-inch knives; one emery wheel, 6-inch diameter, one-inch face; one extra spark plug; two wrenches; one oil can; one set of instructions.

Circulars are being mailed fully describing the complete outfit, and can be had by writing the Standard Gas Engine Company, 5th floor, Caswell building, Milwaukee, Wis.

BEAUTIFUL ELECTRIC FIXTURES.

The Chicago Gas Appliance Company, 30-32 West Lake street, Chicago, call attention in this number to some very low prices on the complete fixtures for four, five, six and seven-room homes. The close price given on these outfits is made with a view of convincing contractors and builders located outside of Chicago that the Chicago Gas Appliance Company can and will give them the advantage of big city prices.

All fixtures furnished by this company are claimed by them to be of the best quality



brass finished, and the designs are so attractive that they cannot help but please the most artistic taste.

The grape dome design is 24 inches in diameter, made of the same high class materials and in the same manner, but containing 800 pieces of glass. The prices quoted on both these fixtures complete for either gas or electric are exceedingly low. A request will tell you what they are.

The Chicago Gas Appliance Company do not issue circulars, but instead send out to architects, contractors, builders and home owners, blue prints on which are shown many attractive designs in gas and electric fixtures. These are mailed free on request.

BALL BEARING HINGES.

For many years the use of ball bearings was limited to high speed machinery, bicycles, roller skates, etc., and later automobiles. Until recently the thought of ball bearings in hardware was unheard of.

But come to think of it, why should not the hardware which is in daily use by everyone be

THIS BEAUTIFUL

Colonnade

CAN BE USED AS

A Music Cabinet
A Book Case or
A China Closet

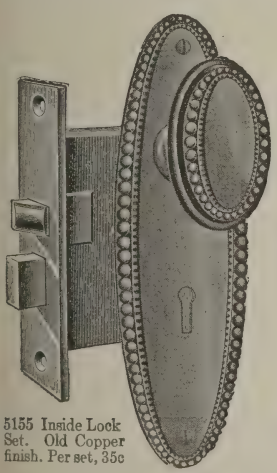
It makes a combination that is useful, sensible and ornamental. In fact, it gives you four attractive pieces of fine woodwork or furniture for the price of one.
The measurements are: width, 26 inches; height, 42 inches; face, 11 inches. Veneered columns. Very compact and well made.

Let's get together. You will like our materials and prices. Write now.

CHICAGO GRILLE WORKS
826-836 Wells Street CHICAGO, ILLINOIS

Special Prices to the Trade

20 Years in the Same Place



5155 Inside Lock Set. Old Copper finish. Per set, 35c

YOU Can Save Money by Sending Us Your Orders for BUILDERS' HARDWARE

FREE

Rehm's Builders' Hardware Catalog and Net Price List.

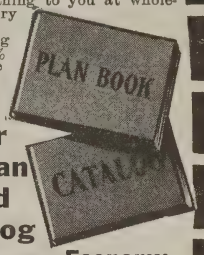
We do not sell to contractors or builders in Cook County, Illinois

REHM HARDWARE CO.
1503 BLUE ISLAND AVENUE
CHICAGO, ILL.

GOING TO BUILD?

IF you're going to build now or *later*, you can't afford to be without these two big *free* books of ours—our magnificent Book of Modern Plans and our new Catalog, 8,000 price saving bargains are shown. Ideas are given you so you can actually save 50% on your lumber and building material. Buy *direct* from us—don't pay *jobber's, dealer's, middleman's* profits—and you'll save yourself a whole lot of dollars and time. Remember we furnish everything to you at wholesale prices and guarantee every inch to be bright and new.

Our method of furnishing material complete saves 50% in price and 100% in trouble and worry.



2 Big FREE Books for You—A Plan Book And Our Catalog

Panel Doors $1.02 Up

Glass Doors $1.99 Up

Economy Rubber Roofing
1-Ply 35 pounds guaranteed 5 yrs. **$1.10**
2-Ply 45 pounds guaranteed 7 yrs. **$1.35**

Get Our 2 FREE Books

8,000 Superb Bargains In This New Catalog Think of it! 8,000 big chances for you to hold down your expense of building or making repairs. Everything for building is shown—lumber, flooring, doors, windows, mouldings, porchwork, building paper, hardware, tinwork and roofing. Be sure to send today for these 2 *free* books. Use the coupon.

Chicago Millwork Supply Company
611 So. Dearborn St.
CHICAGO

FOR $880 We furnish complete all lumber, millwork hardware, spouting, paint—everything except masonry and labor. **A101.**

Just Mail This to Us

Fill In Coupon NOW

DATE .....

FOR $360 We furnish complete all lumber, millwork, hardware, spouting, paint—everything except masonry and labor. **A107.**

Chicago Millwork Supply Company,
611 So. Dearborn Street,
Chicago, Ill.

Gentlemen:—Please send your FREE Books listed below, to—

Name.....

Address ..... State.....

CATALOG No. 31. Building Materials
PLAN BOOK—No. 41. House and Barn Plans

just as free working as the machines used only by the millionaires? With this idea in view, the Stanley Works, New Britain, Conn., began the manufacture of ball bearing hinges. The success with which these hinges have been received might be summed up by the statement that they are universally used in all the most modern buildings.

The Stanley Works will be glad to send full descriptions and further particulars regarding these hinges to anyone interested, and will make special inducements to insure their use in buildings erected by our readers.

"JUSTRIGHT" GALVANIZED ROOFING

The Moeschl-Edwards Corrugating Co., 9th St., Covington, Ky., are placing on the market their "Justright" galvanized roofing. Among the merits which they claim for this roofing is that it is easily applied without the use of special tools, that it is absolutely watertight without painting, that it is moderate in price and needs no repairing.

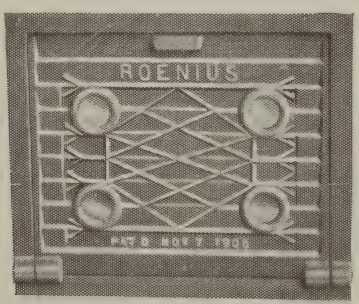
The circulars which they are sending out, besides containing a description of the goods, contain also directions for ordering, such as measurements, sizes of sheets, and various other information.

The Moeschl-Edwards Corrugating Co. are well known as manufacturers of various sheet metal products, including their "Standard" galvanized shingles, which possess unusual advantages for roofing purposes. A line to them will bring complete information regarding any class of structure to which this form of roofing is adapted.

WOOD & COAL CHUTES.

The use of a wood and coal chute is practically indispensible in most buildings. The fact that it is necessary should not detract from its appearance.

The Grand Rapids Foundry Co., Grand Rapids, Mich., manufacturers of the Roenius Wood & Coal Chute, are placing on the market a coal chute designed to stand the abuse to



which an article of this character is subjected, and at the same time have a distinctive and attractive style, which adds to the fine appearance of the building in which it is placed.

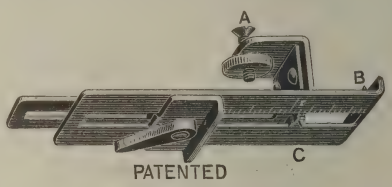
In many places it is desired to have light enter the basement through the coal chute and this is accomplished in the Roenius pattern by the introduction of glass discs, which are protected against breakage.

The Grand Rapids Foundry Co. will be glad to send further information to contractors, builders, or owners interested in wood and coal chutes. Besides this line of goods, the Grand Rapids Foundry Co. manufacture a number of other building specialties, a complete catalogue of which will be sent upon application.

THE GILLIAM BUTT GAUGE.

The possibility of error in laying out a building necessitates great care in measurements, lines, etc., as once the work is started wrong it is difficult and expensive to remedy the error.

There is a great deal of measuring about a building which must be done by the individual workman. On finished work an error means



time and material wasted, or a patched and botched job, and possibly the doors, window casings and jambs marred, scratched and disfigured.

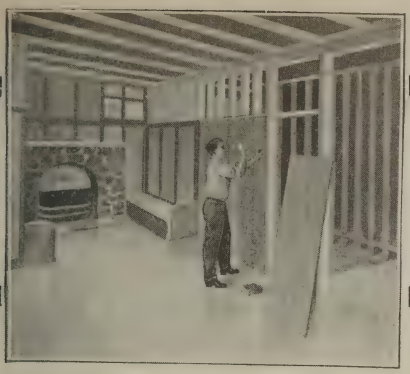
In laying out the mortises for locks, bolts, etc., in gauging for butts or other hardware, and in divers other places, a dependable tool should be used. No foreman will tolerate a two-foot rule and jack-knife method for this work.

One of the handiest tools we have had the pleasure of mentioning in these columns for some time is the Gilliam superior combination butt gauge. It can be used as a butt gauge, mortise gauge or tri-square. The several combinations or adjustments give it a wide range of usefulness, and its light weight, only four ounces, permits it being readily carried about on the job.

Every carpenter is interested in quicker and better methods of doing his work, and the Gilliam Manufacturing Company, Canton, O., are making a special price to readers of the NATIONAL BUILDER when the gauge cannot be obtained at the local hardware store.

SIMPLEX CONCRETE MIXER

THE NATIONAL BUILDER has from time to time given the opinions of various experts regarding the value of concrete mixers. While hand mixing may be advisable in rare cases, where only a limited amount of concrete is to be mixed, the authorities are practically unanimous in declaring that a mixer should be used wherever possible.



This Modern Wall Lining Makes Good Under Severest Tests

By every test, Compo-Board has proven itself the most satisfactory wall-lining. It has stood the test of time for periods of ten to twelve years in hundreds of homes. It resisted earthquake shocks in California which crumpled plaster walls. It keeps the bitter cold out of log cabins in Alaska. Furniture manufacturers using it in their products found that it will not warp. In apartment houses it has stood rough usage, the knocks of furniture and the kicks of children without injury—without peeling or crumbling. It has made thousands of homes everywhere better places in which to live.

Our booklet and sample will explain why every user of Compo-Board including the U. S. government, well known Universities, big hotels and apartment house owners, home owners, contractors and builders prefer it to any other wall lining. There are money making hints in this book for you. Just send your address on a postal.

Northwestern Compo-Board Co.

5776 Lyndale Ave. No., Minneapolis, Minn.

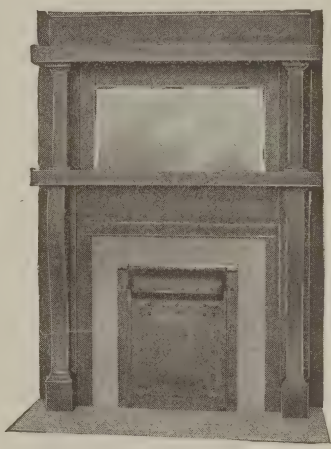
Compo-Board

$28.60

For this Elegant, Massive Selected Oak or Birch

Mahogany Finished Mantel

Beveled Mirror, 18x36 inches



No. 875½

"FROM FACTORY TO YOU"

Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns as shown in cut. **Dealers' price not less than $40.00.**

"Reputation and Quality Count"

CENTRAL MANTELS

are distinctive in workmanship, finish and style. Twenty-five years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

CATALOGUE FREE. Will send our new 100-page catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

Central Mantel Company

1237 Olive Street St. Louis, Mo.

The wide-awake contractor gauges the size of his machine to the approximate work which he does, and as a consequence we see the small contractor having a number of small jobs the possessor of two or more small mixers, which enables him to properly care for the odd jobs which come his way. Other contractors doing jobs containing a greater mass of concrete will have one or more larger machines. Only the very largest concerns, using hundreds of yards of concrete on a job, will employ the largest sizes of mixers.

For various classes of work it is even advisable to have different styles of mixers. Heavy foundation work cannot, as a rule, be done to advantage with a small machine adapted to sidewalk construction and vice versa. The contractor is wise to study carefully the different makes and see which is the most flexible, permitting him to do the widest range of work.

The Miles Mfg. Co., 303 E. Franklin St., Jackson, Mich., manufacture the Simplex Improved Mixer. In their 1912 model are found separate hoppers for stone, cement and sand, with an ingenious arrangement for mixing in any desired proportions. This machine is extremely handy for the general contractor's use, as it is a continuous mixer and there is no delay while the various wheelbarrows are being filled.

The Miles Mfg. Co. also manufacture block machines and other concrete workers, tools and apparatus. Their catalogue is of interest as showing the possibilities of this form of construction, aside from being a catalogue of the Miles product.

"DIAMOND N" EXPANSION BOLTS.

An improvement in One-part Screw Anchors has been placed on the market by the Diamond Expansion Bolt Company, 90 West street, New York, known as "Diamond N" Screw Anchor. The advantages will be found by comparing the accompanying cuts of their regular pattern screw anchor and the new design.

The regular pattern has been used for years

with perfect satisfaction in making all kinds of attachments in various lines of trade requiring expansion bolts, and it is found that the new "Diamond N" Screw Anchor while containing all the good qualities of the regular pattern, has added advantages in greatly increased holding capacity and greater convenience in use.

The transverse ribs at the inner end of the shield give a uniform and secure bearing and grips into the fibre of the material to which it is fastened and presents a greater surface of contact than was formerly the case with the series of Diamond points.

The longitudinal ribs at the outer end of the shield are placed there to bind in the wall with a driving fit when the screw is inserted. These ribs are for the purpose of preventing the shield from turning when the screw is being turned into it.

The maximum expansion being at the inner end gives a very powerful hold, and has in many cases pulled out a section of the wall in extracting it from the hole.

The Diamond Expansion Bolt Co. will be glad to send their complete catalogue showing some of the many uses to which these bolts are adapted, and also showing their complete line of specialties.

SIDEWALK DOORS.

To a certain extent, sidewalks and streets of even the smallest cities and villages belong to the municipality and should not be in any way infringed upon. In many places, however, the authorities allow the use of the space under the sidewalk out to the curb line, and in places like this the use of some form of sidewalk door, coal-hole cover or similar arrangement is necessary.

When these are closed, however, there should be no projections whatever to trip up the unwary pedestrian, and when open, sufficient protection should be likewise provided.

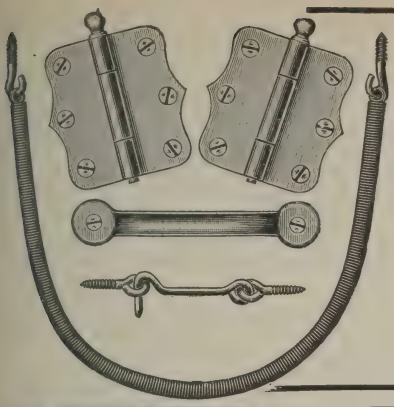
The Canton Foundry & Machine Co., Canton, O., have devoted a great deal of time and thought to the development of sidewalk doors for this purpose. The latest catalogue shows a number of styles, which are in general use, as well as a number of other valuable building specialties. This catalogue is sent free and contractors and builders should have it in order to see what advantages they can take of space otherwise lost, and at the same time provide protection for the public.

THE JACKSON ALUMINUM LINE LEVEL.

A great deal of time is generally taken up in lining up and leveling work about a building, such as brick window heads and sills, floors, joints, etc.

The Jackson Aluminum Line Level is designed to shorten the labor of leveling in places such as these. This instrument consists of a very accurate level and a line, on which the level can be suspended. By merely getting the line level, all work can be laid out from it with ease and accuracy. The entire outfit is so light that it can be easily carried in the pocket. Besides being used on a line, the level is designed to be used on the steel square or pocket rule, thus making it extremely valuable for economical work.

The Jos. A. Woodwell Company, 201-203 Wood street, Pittsburgh, Pa., manufacture these levels as well as a number of other woodworkers tools. Their complete catalogue will be sent on application.



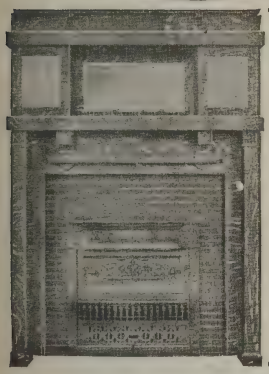
STANLEY'S
SCREEN DOOR HARDWARE

Complete Sets in Convenient Packages

One pair of Ornamental Surface Butts; One Wrought Steel 5-inch Pull; One Gate Hook and Eye; One high grade No. 3 Steel Spring, all in a neat box with the screws to put them on the door.

Ask for Stanley's Set No. 1750 or write us for attractive circular "N1" giving full information.

THE STANLEY WORKS New Britain, Conn. New York Chicago



QUARTERED OAK MISSION MANTEL

$42.00 Complete

With Coppered Art Glass, Beveled Mirror, Enameled Tile All Colors, and Grate.

Our 68 page catalogue shows complete line of more and less expensive mantels.
Sent free upon request.

Edw. F. Sonntag Mantel Co.
316 Sixth Street, Evansville, Ind.

Herrick Refrigerators

Are fully described in our Booklet No. 41 with blue prints that are of value to every architect, contractor and builder.

The best possible construction, circulation and insulation are embodied in every Herrick Refrigerator, whether it's from our varied stock or built to conform with architect's specifications. Every builder should be posted on the **Herrick** line and take advantage of our policy of co-operation.

Write for particulars and for a copy of the latest HERRICK catalog.

HERRICK REFRIGERATOR CO.
WATERLOO, IOWA

KOLL'S PATENT **Lock Joint Columns**

Hot Off the Press

Our trade bulletin No. 1 containing valuable information for the Architect, Woodworker and Builder. All the information you need regarding wood columns. This is free for the asking.

THEY CANNOT COME APART

HARTMANN-SANDERS COMPANY

Main Office and Factory, 2155 ELSTON AVENUE, CHICAGO
Eastern Office, 1123 BROADWAY, NEW YORK CITY

POCKET EDITIONS.

Many contractors like to carry a pocket catalogue of their favorite tool manufacturer. These small editions are also extremely handy where office space is limited.

With this aim in view, the Millers Falls Co., 28 Warren St., New York City, have issued their catalogue "F" showing their complete line of woodworkers' tools. As might be expected from a concern of this character, the catalogue shows a number of novelties as well as the so-called standard tools and machines. The Millers Falls Co. are the manufacturers of the Langdon Mitre Box, which is fully described in this catalogue, as well as several other novelties not found elsewhere. Carpenters who are subscribers to THE NATIONAL BUILDER can obtain this book free.

MEASURING SIMPLIFIED.

A new kind of rule that has been on the market long enough to be given every test, has shown itself to be worthy of the success it has already met with and the high place it is destined to take with everybody whose business it is to know "how long" and "how far between."

We now have six foot poles, yard sticks, folding rules, zig-zag rules and tape measures all of which have their uses and limitations but the Master Slide Rule appears to possess most

of the advantages and conveniences of them all together, with one or two advantages exclusively its own.

The longest Master Slide Rule now made is six feet. It will be seen from the illustration that it can be extended to its full length by one operation, viz.: pulling it straight out. There you have a measure rigid enough to bear its own weight from the end so measurements may be taken six feet above the highest reach of the arm. It can be instantly closed and is as compact as any pocket rule.

But it is when measuring between door jambs, window frames or in narrow closets that its exclusive features are apparent. One of the illustrations on this page shows how such measurements are taken. The lower slide of the rule is pulled out until the rule becomes just long enough to fill the space and the exact distance is indicated without figuring or calculation.

Here's another point: Breaking does not spoil the master rule. The best of rules sometimes get stepped on or otherwise broken. With other rules that is the end of them, but if you break a Master just send it with ten cents to the makers and a new section will be put in good as new.

The conveniences and many uses of the rule are found the more the rule is used. Fuller description will be sent by applying to the manufacturers, the Dahl Manufacturing Company, 1 West Forty-second street, New York.

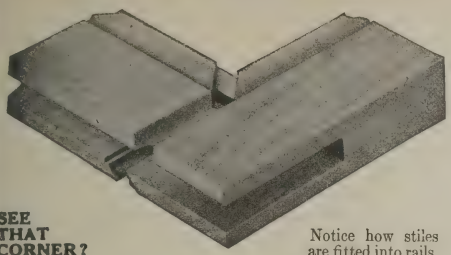
KLIMAX BUNGALOW DOORS.

The Paine Lumber Company, Oshkosh, Wis., originators of the famous "Korelock" door, advise us that they are now making a soft-wood door known by the trade name "Klimax,"

Klimax Bungalow Door, B-6

which promises to become as popular as the Korelock line.

These doors, we understand are made with solid soft-wood stiles and rails, with non-shrinkable birch three-ply panels. They come in a number of beautiful and original designs, of which we show two. In making up their stock patterns, the Paine Lumber Company



SEE THAT CORNER?

Notice how stiles are fitted into rails.

MADE TO ORDER

Fly Screens and Screen Doors

We use the best grades of wire, black enamel, galvanized, pearl and copper bronze, fastened by the improved **Standard Shoulder Strip Method,** which makes the wire drum tight and firm, can not sag or pull away.

Dealers, Carpenters, Contractors and Builders, write for a free copy of our 1912 illustrated catalog

STANDARD SCREEN CO., 1848-50 W. 14th Street Chicago, Ill.

Our screens are all mortised, tenoned, joined with waterproof glue and pinned with steel pins, will last a lifetime

This Single Lip Bit Will Not Drift

The chief fault of the majority of Single Lip Bits is that they drift out of line with the least twist in the grain. This fact leads many mechanics to believe that a Single lip bit is inferior to a Double lip bit.

Ask any man who uses a

FORD

Single lip bit if he has any trouble with its drifting. That's the best proof we can give you of its superiority over all others. It's so made that it **can't** drift—we warrant it not to drift in **any** wood, warrant it to hold true against the hardest knots or the toughest grain. It bores 40% easier and does **more** than **any** Double lip bit **can** do.

We use a special steel—steel that we warrant to stand more nails than any other bit made. This means **more wear, longer life,—less auger bit expense.**

Your dealer has it or can easily get **the genuine Ford** for you. We guarantee the **GENUINE** in every way.

Write for additional information about this splendid bit. We'll send you free a handy pocket memo book. Address Dept. 2C.

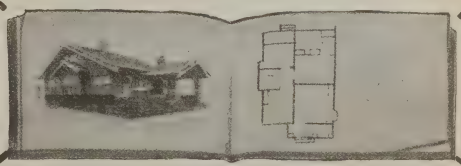
FORD AUGER BIT CO.
Holyoke, Mass.

Be the "Bungalow Man"

OF YOUR OWN TOWN

There's Money in it for You

Shingled Bungalows sell faster because they are so charming and so practical. This book of plans and designs will help you.



This BUNGALOW BOOK *Free*

Contains original, practical, beautiful designs for Bungalows, Country Homes and City Residences. It especially deals with the delightful West Coast Bungalow, a style of home suitable to all climates. Shows 24 photographs and floor plans of dwellings actually built at the cost given. Tells the interesting story of Red Cedar Shingles, how to make a new roof last a life-time, how to save frequent paintings and how to finish the exterior of your building artistically and economically.

Dipping shingles in stain costs only half as much as painting clapboard siding. You never paint shingles.

We have no plans or books to sell. We are manufacturers of Red Cedar Shingles and want you to know about Red Cedar before you build. Send 2c stamp to cover the mailing of this valuable book.

Red Cedar Shingle Mfrs. Assn.
516 White Bldg., Seattle, Wash.
Representing over 200 mills—capacity 20 millions daily.

OAK FLOORING

Increases the Renting and Selling Values and Attracts a Better Class of Tenants

Builders and **owners** will find it a clinching argument to say, "It's floored with OAK FLOORING." It imparts an air of **refinement** and **elegance. It is the modern flooring.**

OAK FLOORING ⅜″ thickness by 1½″ or 2″ face can be laid **over old floors** in old homes or over cheap sub-floors in new homes **at a very low cost.** it is **cheaper than carpets** or **pine flooring.** When laid it has all the appearance of heavy flooring.

There is a **solid satisfaction** and **lasting pleasure** in the **substantial** and **dignified appearance** of OAK FLOORING.

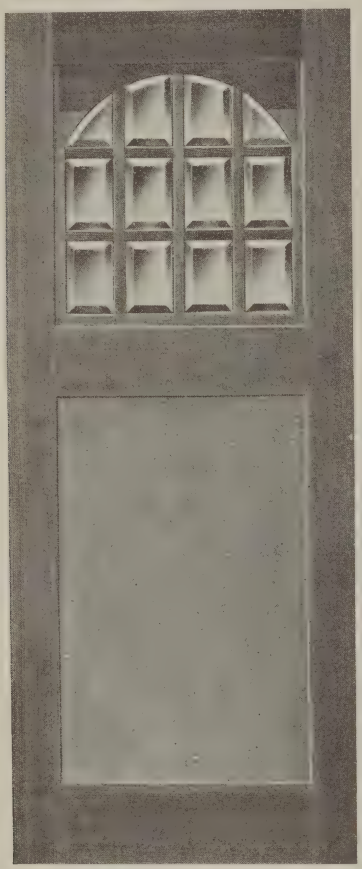
Contractors and carpenters find it very profitable to lay ⅜″ stock over old floors in old homes during dull periods. A little **canvassing** is all that is necessary to **secure** jobs.

For **durability** OAK is the **best.** OAK FLOORING laid thirty years ago, after very hard use, is still in good condition. ¶ **WRITE FOR CATALOG.**

THE OAK FLOORING BUREAU, 883 Hammond Building, Detroit, Michigan

Please mention NATIONAL BUILDER when writing to advertisers.

have been guided by the growing tendency toward individuality in homes. In consequence, the patterns are so made that without additional expense the customer can secure a variety of styles in panels, glass, etc., thus meeting individual tastes and needs, and providing



Klimax Bungalow Door, B-7

a variety where several similar doors are located near together.

While it is probable that Klimax doors, both in regular and bungalow styles may be seen at the nearest dealers' warehouses, the Paine Lumber Company will be glad to send a catalogue to those interested in the latest in doors.

STEEL OFFICE FURNITURE.

The inherent advantages of steel over wood for office equipment are so thoroughly recognized as to require no extended comment. Steel filing devices are safer, stronger and more durable. Their non-combustible and fire-resistive properties are in line with modern advanced practice, which tends to the elimination of inflammable materials from building construction and equipment.

Steel filing equipment and furniture not only furnishes no food for flames, but becomes actually a fire retardent and a protection for its contents, being entirely unaffected by atmospheric changes, it does not shrink, swell, stick or come apart.

The Berger Mfg. Co., Canton, O., are foremost in the manufacture of goods of this character. Only the largest concerns can manufacture these goods to advantage on account of the number of large and expensive dies used in forming the various parts.

The catalogue which the Berger Co. is sending out shows a very complete line of filing cases, cabinets, tables, etc., for every purpose, and no office manager should be without this catalogue.

PORTABLE WOODWORKERS.

The use of portable woodworkers have become so general that few contractors can afford to be without them. The saw table, which was the forerunner of the woodworker is a great saver of time and material, while the numerous attachments which will be found on high-grade machines converts the saw table into practically a complete machine shop.

The use of gasoline and electric power for operating these machines renders possible a large amount of work that formerly went to the planing mill, necessitating a considerable delay. The up-to-date contractor is now prepared to handle all such work as odd frames, mouldings, casings, etc., without going out of the shop.

The Grimm Manufacturing Company, 42 Erie street, Buffalo, N. Y., manufacture a machine adapted to do a great amount of work heretofore done laboriously by hand. This machine is operated either by electric motor, gasoline engine, or by belt drive. A line to the Grimm Manufacturing Company will bring complete information.

PAVEMENT LIFTS.

Modern store buildings require that there shall be means for lowering heavy objects to the basement floor and for carrying out such material as ashes, rubbish, etc., besides the material incident to the ordinary use of the building. While it is possible, of course, to slide boxes and barrels down an incline, it is difficult to raise material up to the street level.

The various styles of pavement lifts manufactured by J. G. Speidel, Reading, Pa., solve the question of transporting this class of material. These lifts are made in various capacities and sizes, and as a rule are shipped with all parts complete, thus avoiding any chance for improper construction, or installation.

The latest catalogue, which Mr. Speidel is sending out, shows this class of lifts, as well as chain-blocks, hoists, overhead trolleys, cranes, and other labor saving apparatus for the use of the contractor. This catalogue is sent free upon application and Mr. Speidel is competent to advise regarding the best style of machine to use for various purposes and situations.

SAVES TOOLS, TIME, MONEY, MAKES WORK EASIER

30 Days Free Trial

Prove by 30 Days Free Trial how this shop grinding outfit saves tools, time and money. Prove how this outfit makes tool sharpening so easy that tools are always in perfect edge, making all work so much easier and enabling every workman to accomplish more work. Use this outfit 30 days free, then if you are willing to part with it, send it back at my expense.

No Money Needed

MECHANICS OUTFIT—14 MACHINES IN ONE

Guaranteed 5 Years

DIMO-GRIT — "the wheel for steel" — 25 times faster than grindstone—10 times more efficient than emery—will not draw temper

Dimo-Grit, the new artificial diamond abrasive, is a twin product of carborundum, but Dimo-Grit is especially suitable for steel, leaving the smoothest, keenest edge—cuts hardest steel as emery does soft copper. It peels steel away in tiny shavings instead of wearing it away like grindstones or emery wheels—never glazes, no heat developed—no need of water cooling—no danger of drawing temper. Genuine South African diamonds could cut steel no quicker—outwears any number of emery and grindstones. Carborundum wheels furnished if wanted.

Return this Coupon

Luther Hummer Tool Grinder

Foot or engine power—runs by foot power easy as sewing machine—built of steel—shaft drive like automobile—dust-proof bearings—gravity lubrication—costs no more than cheap chain drive grinders—half a million Luther Grinders now in use—5 years guarantee—shop outfit provides for every sharpening, grinding, buffing and polishing need for mechanics, carpenters and all other tool users. Extra attachments convert it into turning lathe, jig and circle saw, force feed drill, etc.—16 extra attachments—completely equips your workshop at low cost.

40 Page Free Book Tells the interesting story of artificial diamond abrasives as printed in McClure's Magazine—gives valuable pointers on tool grinding—fully describes all attachments and outfits. No red tape—no promises—no money needed to try this money-saving shop outfit free for 30 days. Return the coupon for full information and decide which outfit you want on 30 days free trial.

Luther Grinder Mfg. Co. 819 MICHIGAN ST. MILWAUKEE, WIS.

Return This Coupon for Free Trial Offer

You put yourself under no obligation by returning this coupon—we will tell you all about our Free Trial Offer, and send you our 40 page book free. Don't delay—return this coupon today.

Dimo-Grit Sharpening Stones

Ask your dealer for Dimo-Grit Sharpening stones—the fastest, smoothest stones for steel—look for the name "Dimo-Grit" on the stones.

COUPON

Luther Grinder Mfg. Co.,
819 Michigan St., Milwaukee, Wis.

Please send me 30 days Free Trial Offer and 40 page Free Book. It is understood that this coupon does not obligate me in any way.

NAME .....

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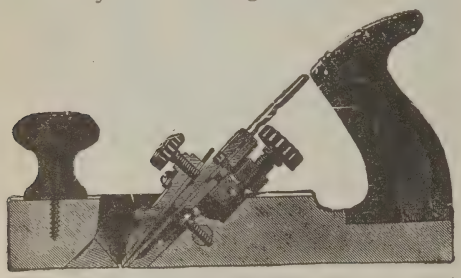
SELF-SETTING PLANES.

The Gage Tool Company, Vineland, N. J., have a unique proposition to carpenters, in which they are offering their planes at a



greatly reduced rate to readers of the National Builder. They believe that one plane in a neighborhood will be the immediate cause of repeat orders from the carpenter and his friends and for this reason they are making a number of alternative offers to those who write for information.

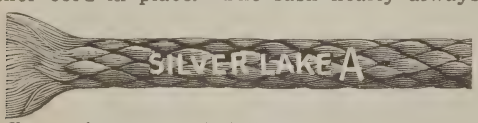
SOLID BRAIDED CORDAGE.

The use of a soft, flexible material for making sash cord is necessary on account of the repeated bending and straightening as the cord runs over the pulley.

The tensile strength of any sash cord, chain or ribbon is ample for sustaining the weight put upon it. The failure generally occurs in the portion working over the pulley, that is, where the bending occurs.

Many textile fibres have a greater strength than cotton, but through their brittleness in comparison, are not as durable. When the fibres begin to break, the cord frays, works hard, catches, and finally a sudden strain breaks it.

The trouble is the loss of the cord is the smallest item. The cord costs but a trifle, but it requires considerable work to get another cord in place. The sash nearly always



suffers when a cord fails, and the glass is nearly always broken, sometimes causing further damage.

The Silver Lake Company, 78 Chauncey street, Boston, Mass., have been making solid braided cotton cord for forty years, and take a great deal of pride in their product. A number of sizes are made for sash cord alone, stamped every foot as shown, while their entire line includes a product especially made for every purpose for which a durable cord is required.

Silver Lake sash cord is for sale by dealers generally, but the manufacturers will be pleased to hear from any one desiring fuller information regarding cordage for particular uses. Among other things they make a dandy chalk line. Send for a sample.

HAVE YOU INVESTIGATED AMATITE?

Nobody who is buying ready roofing from time to time has any business to be ignorant of the fact that there is a very large and rapidly increasing amount of no-paint roofings coming into use. The painting feature was the only objection to the old-style smooth-coated roofing. Painting cost money and was very apt to be neglected in the interests of other matters that were more pressing—then, before the owner woke up, the roofings had begun to lose their waterproof characteristics, were absorbing water and being injured by frost. Accordingly, the advent of Amatite, with its practical mineral surface, was hailed with much satisfaction by ready roofing users, and the sales of the new invention have been increasing with tremendous rapidity. The simple fact that Amatite Roofing costs no more than the painted kind, will last as long and longer, and involves no maintenance expense whatever made it a favorite all over the country.

Simply as a matter of relative economy and satisfaction, look up Amatite. You can do so very easily by simply addressing a request for a sample to the nearest office of the Barrett Manufacturing Company, New York, Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburg, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle.

CONCRETE FLOOR SURFACES.

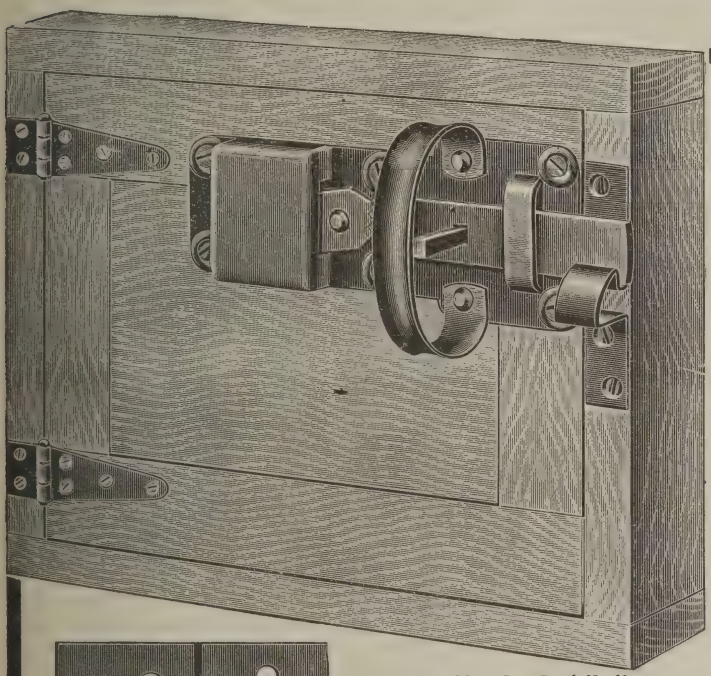
By F. P. Foster, Jr.

Of recent years unusual attention has been given to the development of special materials for the perfection, protection and decoration of modern building construction, with special reference to concrete surfaces. For the benefit of master painters, as well as for architects, builders and contractors, it is well to furnish detailed specifications relative to proper use of such materials. The subject of the present paper being the treatment of concrete floor surfaces, the writer will not attempt to describe any complete line of finishes for waterproofing or decorating concrete, but will be limited to the subject in hand.

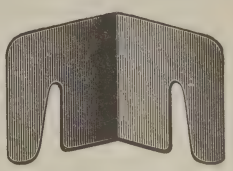
While there are numerous materials for treating concrete floors on the market, made by various manufacturers, it is well, after experimenting, to learn the value of one special material and to become absolutely familiar with the best method of using it. One of the best-known materials for this purpose is Glidden's concrete floor dressing, which is made in the following colors: Light drab, dark drab, terra cotta, tan, white, green and also in transparent. This floor dressing has splendid covering capacity, the first coat covering from 300 to 350 square feet to the gallon, United States measure, and 360 to 430 feet to the gallon, Imperial measure. The second or finishing coat will cover from 350 to 400 square feet to the gallon, United States measure, and 430 to 500 Imperial measure, and its cost of application is by no means excessive, as the cost of the material itself is approximately ½ cent per square

BROTHER CARPENTER—ARE YOU SATISFIED

that you are using the right kind of goods? If not, then let us prove to you that you can save time and money by using ours, even at a higher price. This has been proven to others and it can be proven to you. Convince yourself regarding our goods and you'll be satisfied and satisfy your customers

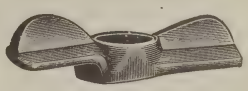


Diehl's All Steel Barn Door Latch No. 10

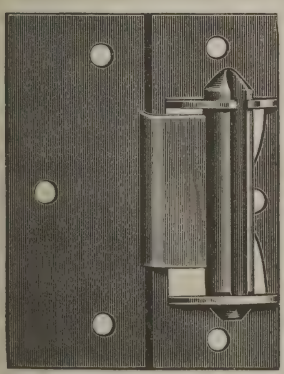


Diehl's Corner Braces for Porch Screening No. 55

Diehl's Couplings for Porch Screening No. 60



Diehl's Shank Button No. 25



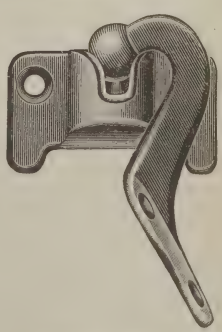
Diehl's Screen and Storm Door Hinge No. 20

We are the largest manufacturers of

Builders' Hardware Specialties

in the Northwest

Everything we make is right in workmanship, material and design.
Send for catalogue showing full line.
Specify and buy Diehl's every time.



Diehl's No. 1 Sash Hanger

DIEHL NOVELTY COMPANY

Sheboygan, Wisconsin

foot to each coat; the cost of labor varying from 2¼ cents to 3¼ cents per square foot for the finished job, which includes two coats, and any touching up which may be necessary, or about ⅞ cent to 1⅜ cents per square foot for each coat, according to the rate per hour paid for the labor.

The transparent floor dressing is of particular value for the floors of factories, warehouses, mills or any other floors which are subjected to extremely severe conditions of wear. In this connection it is essential to know that concrete floors should never be treated or dressed until they are thoroughly dry and well seasoned, and the dressing should be applied before they have been subjected to traffic or wear. In some instances it is necessary to use an acid wash or some other neutralizing medium before applying any dressing to concrete floors, but in the case of Glidden's concrete floor dressing this is not necessary, owing to the fact that this material is neutral and therefore uninfluenced by either acid or alkaline conditions.

Glidden's concrete floor dressing should not be used upon damp floors or floors which are subject to seepage. A coat of Glidden's liquid rubber applied over the floor surface will overcome such conditions. This liquid rubber is a black, elastic bitumen, and is applied by means of a brush, over which an inch top coat of concrete, waterproofed with Glidden's mass waterproofing should be applied, using two and one-half pounds of waterproofing to each bag of cement used in the concrete aggregate, adding same after the water has been added. When the concrete is thoroughly dry and seasoned, two coats of concrete floor dressing should be applied in accord with the above specifications—this same specification may be used upon damp basement walls which are subject to seepage, making a cement mortar veneer of one-half inch thickness and applying two coats of Glidden's white liquid cement (coating) upon the surface, after the same is thoroughly dry, in place of two coats of floor dressing. This specification will serve for damp basement floors and walls, and it produces a sanitary and light radiating basement.

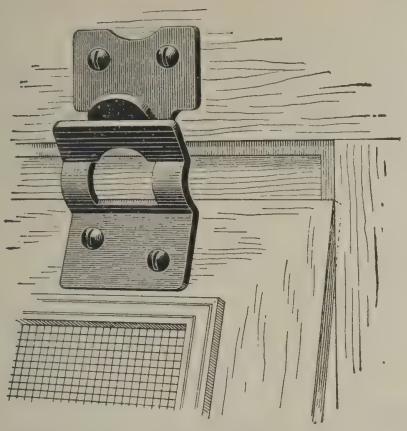
Concrete floors having exceedingly fine, close texture, floated to a dense surface, which carry at times a semi-gloss finish, should be treated as follows: The surface should be gone over lightly with a carborundum rubbing brick in order to establish a bonding surface that will enable the concrete floor dressing to knit close to the floor structure and practically become integral with it. This will prevent scaling and peeling of the floor dressing. The floors should, of course, be cleaned, thoroughly dry, and well seasoned before the first or priming coat of concrete floor dressing is applied. Transparent floor dressing or any color desired may be used. It should be applied by means of a suitable brush. The dressing should be worked well into the pores of the concrete, spreading it well over the floor surface to develop a thin film. The temperature conditions during the periods of application and drying should not be under 70 degrees F. to insure the best results. The second coat should not be applied until the first or priming coat is thoroughly dry, which under proper temperature conditions requires from two to three days. The second coat should be brushed out evenly and uniformly over the surface in the same manner as one would apply a finishing coat of floor varnish, and it should be given from four to six days for thorough hardening. Two coats develop a very satisfactory result, though three coats should be used where floors are submitted to unusual wear, such as floors that are used as passages, aisles and runways over which heavy trucking is done.

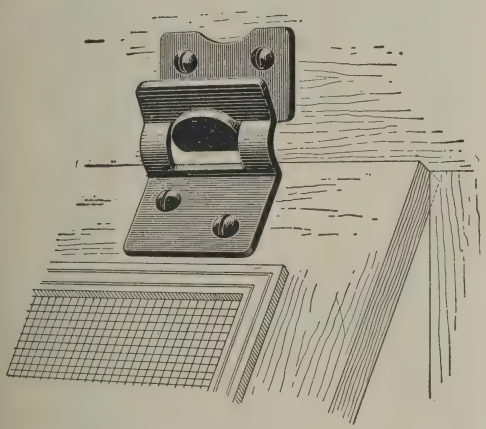
Concrete floors of exceedingly coarse texture should be cleaned, thoroughly dry, and well seasoned before the first or priming coat of Glidden's concrete floor dressing is applied. Either the transparent floor dressing or any color desired may be used, and should be applied by means of a suitable brush, such as is described for use on concrete floors of fine texture. The dressing should be worked well into the pores of the concrete in order to bond and bind it thoroughly. The temperature conditions during periods of application and drying should not be under 70 degrees F. to insure the best results. After the first coat is thoroughly dry all surface areas or spots which may show unusual absorption or penetration of floor dressing should be "touched up" or gone over with an additional coat of dressing, in order to prepare a uniform surface for the finishing coat. After the first coat is thoroughly dry, the finishing coat should be applied, brushing same out evenly and uniformly over the surface, as described in the specification for concrete floors of fine texture. The finishing coat should be allowed to harden from four to six days.

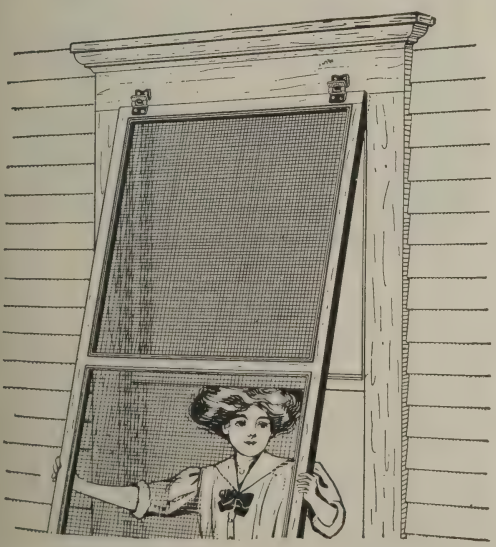
Concrete floors of irregular texture—by which expression is meant those floors which are made up of extremely fine and extremely coarse texture laid irregularly, which is sometimes due to carelessness, but often due to unforeseen conditions—should be given a joint application of the specifications described for concrete floors of fine texture, and concrete floors of coarse texture.

Concrete floors of normal, uniform texture should be cleaned, thoroughly dry, and well seasoned when the first or priming coat of Glidden's concrete floor dressing is applied. In this instance, as well as others, the transparent floor dressing, or any other color desired may be used, and it should be applied by means of a brush and worked well into the pores of the concrete, spreading the surplus well over the floor surface to develop a thin film.

Floors which are laid in colors, such as terra cotta, green, etc., or where inert colors are mixed throughout the cement veneer or wearing surface, after being thoroughly cleaned, dried and well seasoned should be given two coats of Glidden's transparent floor dressing, applied under the same conditions as is described for the normal or uniform texture.







WE INITIATE—NEVER IMITATE

It's Easy

to hang full length screens with

"National Automatic" SCREEN HANGERS

Simply rest top of screen against blind stops inside of casing and slide screen up. It will hook automatically.

These hangers are easily attached and will hold screen firmly in position and prevent rattling.

Ask your dealer for National No. 80 Automatic and be sure to get them.

General catalog mailed on request

National Mfg. Co.

Sterling, Ill.

COMPO COMMENTS.

The Northwestern Compo-Board Company, 5776 Lyndale avenue, Minneapolis, Minn., are sending out a pamphlet containing comments on their product, and giving some of the thousands of uses to which this material has been put.

The numerous letters are interesting, as showing that the manufacturers do not yet realize all the conditions under which Compo-Board may be used. From Alaska, where it is used to keep out the cold, from California, where it resists the earthquakes, from every state in the Union, the letters tell of using Compo-Board for lining kitchens, bath rooms, garages; to keep out the heat, to keep out the cold, to keep out the wind, to keep out the dust, to keep out the dampness; to make a house warm, and to keep an ice box cold.

A window trimmer uses Compo-Board for backgrounds, partitions and booths, for temporary and permanent use. Decorators work on it with oil and with water colors, and paper hangers mount samples of wall paper on it.

Manufacturers use the large sheets of Compo-Board in pipe organs, china closets, packing boxes, filing case divisions, medicine closets, mirror backs, kitchen cabinets, show cases and theatrical decorations.

Artists use Compo-Board for mounting drawings, maps, etc., for the backs of picture frames, calendars, posters, bulletin boards, etc.

Contractors have found Compo-Board ideal for the rush job that cannot wait for plaster to be put on and dry, as well as for those places where a smooth, firm surface is required.

These are only a few of the many uses that have been found for Compo-Board. The booklet "Compo Comments" gives many more and gives the names of the users too. Better get it and see where you can use Compo-Board.

MODERN MOTORS.

So much machinery is being installed by the up-to-date contractor that every contractor, builder and mechanic should be posted upon the various styles of engines. While in some favored places, electric power may be used and in others, steam is an advantage, the great bulk of the machines will be operated by power from gasoline motors.

The Gray Motor Company, 561 United States Motor building, Detroit, Mich., are building a two-cycle stationary engine especially adapted for the contractor and builder. This engine can be used either in the shop or on the job and its construction is such that a number of machines can be run by the same engine. This is particularly satisfactory in shops where lathes, saws, grinders, and other machinery are in use at the one time.

The Gray Motor Company have constantly been obliged to increase their factories and take great pleasure in showing visitors every detail in the construction of their engines. This, in itself, would indicate confidence in every point and a disposition to obtain criticism wherever possible.

In the question of selection of the proper motor to use, the Gray Motor Company have at the service of their customers, a number of skilled engineers who have given the subject of power and transmission a great deal of study, and they will be glad to hear from those who have special requirements to meet.

MODERN MANTELS.

Our grandfathers thought that no house was complete without a fireplace, and even today few homes in England are planned without a fireplace in each room. In this country one or

two rooms are usually selected to contain fireplaces, and this is generally made the central feature of that room.

The Edw. F. Sonntag Mantel & Tile Company, 316 Sixth street, Evansville, Ind., have just prepared a six-page catalogue showing a number of beautiful designs in modern mantels. This catalogue, of which we show one illustration, is sent free to our readers. Every contractor should be posted on the prices at which these mantels can be obtained in order that he may intelligently advise his clients in regard to them.

Light, Strong, Quickly Put up

Stiff Leg Derrick

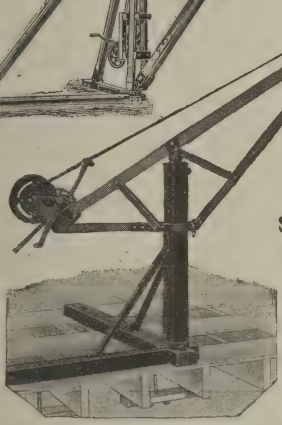
split mast and boom for hand and power use. Equipped with all crucible steel fittings and gears, capacity 2 tons. For prices give length of boom, and if winch is desired.

Sasgen Circle Swing Reinforced

Builders Derrick

$45.00

complete ready for use with geared winch, 150 ft. 5-16" cable, block fasteners, etc., capacity 2500 lbs.



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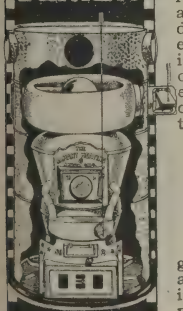
Specify the Jahant DownDraft Furnace



Write for Terms and Free Furnace Handbook

OUR SERVICE DEPARTMENT

will cooperate with any Builder, Contractor or Architect who wishes to specify or install a dependable heating equipment. The **Jahant Down-Draft Furnace** solves the heating and ventilating problem for residences, schools, hotels, churches, and similar structures. Our 365 day "Guaranty Bond" given with every furnace insures absolute satisfaction. Send us details, sketches or blue prints of the building to be erected, and we will furnish without cost special plans, specifications and blue prints of a

JAHANT DOWN-DRAFT FURNACE

guaranteed to furnish plenty of heat at a minimum cost for fuel. If you include the Jahant in your finished plans we will pay freight on the complete shipment of furnace, pipes, registers, all fittings and the necessary tools.

Write for our free Specification Hand Book. It tells more about the Jahant and our co-operative plan.

THE JAHANT HEATING CO.

90 Mills St., AKRON, OHIO

Furnace Builders for over 30 Yrs.

Protect Your Concrete With Bay State Brick and Cement Coating

It is being specified by the leading architects and contractors not only as a coating on cement, stucco and brick surfaces to protect them against moisture, but on high grade interior work on both wood and plaster.

When you need a coating for cement and want something that will stand up and give protection and durability, also a pleasing finish, use the **Bay State Brick and Cement Coating,** which is the result of research and experimental work for more than a decade. Wherever it is used on stucco, concrete, wood or plaster, it stands up better than any other.

You know how necessary it is to protect concrete surfaces against dampness. My coating is dampproof and gives a pleasing appearance without destroying the texture of concrete and in addition is a fire retarder.

Write for particulars about **Bay State Brick and Cement Coating.** Address for booklet No. 10,

Wadsworth, Howland & Co., Inc.

Paint and Varnish Makers and Lead Corroders

82-84 Washington Street Boston, Mass.

DULL KOTE PAINTS.

There are many places in our modern buildings which must be finished with a sanitary, artistic and permanent coating. Wherever plaster, wall board or similar construction was used the surface must be decorated by some material which is sanitary, artistic and permanent.

The use of Johnston's Dull Kote Paint on surfaces of this character gives tasteful decorative effects, while the application of the paint requires no unusual skill and the cost of the paint is slight.

This paint contains no white lead or other injurious substances; from its nature, it will not rub, flake or peel off, but dries hard with a washable surface. Brush marks do not show and laps can be made without leaving a line.

Dull Kote Paint is excellent for use over concrete or cement, as well as on plaster work or metal.

The R. F. Johnston Paint Co., Pearl & Main Sts., Cincinnati, O., manufacture Dull Kote Paint in a wide range of colors. Their books of directions are simple and explicit and show in great detail the various uses to which Dull Kote Paint is adapted. We would suggest that those interested in the highest grade of interior decoration write for their latest catalogues and literature.

TWENTY-FIVE YEARS IN ONE PLACE.

The John Hardin Company has been selling plumbing goods to contractors and builders in every part of the United States for over twenty-five years—and at the same old address.

The Porcelain Enameled Roll Rimmed Sink which they are specializing on in their advertisements in this number is just one of their many bargains. It is described as follows: "Porcelain Enameled Roll Rimmed Sink, having back and drain board all in one piece, wall hanger, adjustable legs, concealed galvanized air chambers, nickel-plated strainer, Fuller adjustable flanged bibbs and "P" trap, with waste to wall. The sink is 20 by 30 inches with 20 by 24-inch counter; sink drain brass; 12-inch back, extending over sink, and runboard all in one piece."

Because the Hardin Comapny bought two carloads of these sinks, they have made a very low price, which includes two $1.50 faucets and a large 1½-inch trap.

A folder recently mailed by the John Hardin Company offered other bargains in stoneware, laundry tubs, lavatories, bath tubs, etc.

A new catalogue is being prepared and can be had free by writing to Eugene A. Hardin, Manager, John Hardin Company, 4541-4549 Cottage Grove avenue, Chicago. Those who get their names on the mailing list of this old, established company will receive circulars from time to time on different things in the plumbing lines which are well worth while knowing about.

ASBESTOS SHINGLES.

From the earliest times roofing has been a subject seriously considered by everyone who contemplated the erection of a building. Many different materials have been used and each in its place has proven more or less serviceable and satisfactory.

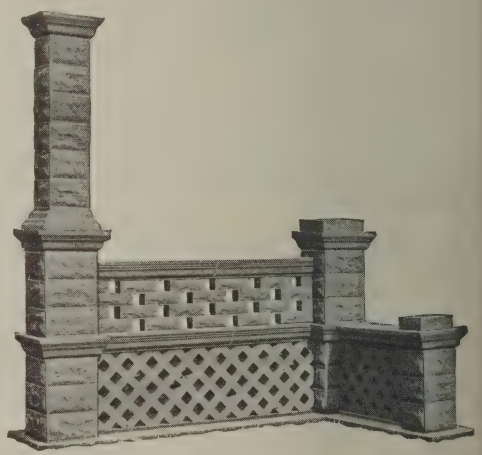
Modern conditions require a roof which shall be permanent, artistic and fireproof. In the manufacture of asbestos shingles, the Keasbey & Mattison Co., Ambler, Pa., have produced an ideal roof covering. This material has had a test of a good many years and has proven extremely durable under the severest weather conditions.

When properly applied, asbestos shingles should outlast the rest of the building and provide a watertight covering during all that time.

The Keasbey & Mattison Co. have a long list of buildings in various parts of the country which have been covered with their asbestos shingles, and we would suggest that anyone interested write to them for this list and for the names of people in their vicinity who have used the shingles, as a personal visit will convince one of their superiority.

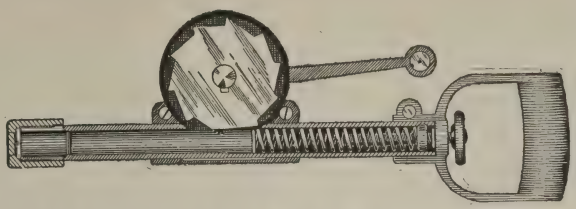
PORCH CONSTRUCTION.

The W. E. Dunn Manufacturing Company, 4135 Fillmore street, Chicago, Ill., are sending to their former customers, a circular showing their combination moulds. Among one



set which we particularly note, is the one for making porch details.

The work done on this combination in connection with their regular block machine is shown in the cut herewith. Besides the patterns shown in this piece of work, the combination permits making blocks of a large variety of other sizes. We would suggest that all those engaged in making concrete blocks and similar work, send to the W. E. Dunn Manufacturing Company for their catalogue and circulars showing this class of work.



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Drills Holes in Stone, Concrete, Brick, Marble, Tile, Conduit, etc.

WILL DRILL 10 TIMES FASTER THAN BY HAND

strikes 800 to 2000 blows per minute. An indispensable tool for Carpenters, Steam Fitters, Plumbers, Stone Masons and Electricians. Simple in construction and action. Fully guaranteed. You turn the crank, the spring does the work.

Makes perfectly round and straight hole ⅜ inch to 1½ inch in diameter, true to size from start to finish.

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ORR & LOCKETT HARDWARE Co

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Investigate Before You Buy

and you will find we can save you lots of money on anything in the line of HIGH-GRADE sash, doors, frames, blinds, mouldings, inside trim, grilles, colonnades, stair and porch work, mantels, grates, tiling, art glass, paints, roofing and building papers, wall boards, hardware, hardwood and parquetry flooring, rolling partitions, screens, steel ceilings, gutters, shingles, etc.

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Prompt shipments and materials all first-class.

Let us send you our SPECIAL FIREPLACE CATALOG—showing unusual values.

The Huber Builders Material Co.
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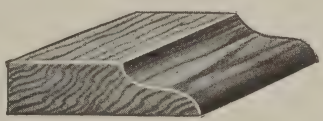
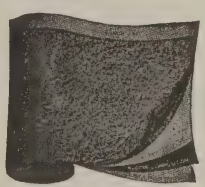


WINDOW BEAD
Best Yellow Pine
27c per 100 lineal feet



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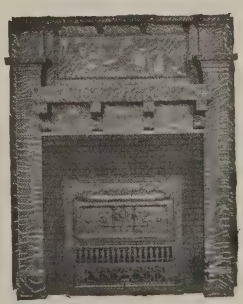

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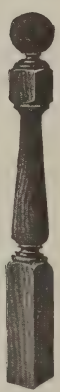

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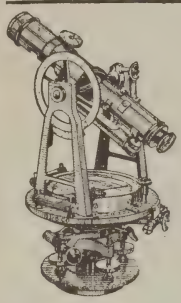

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Established 1874

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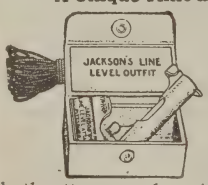
A Unique Time and Labor Saving Device



It takes the place of the old-fashioned sixteen-foot straight edge, yet it can be carried in your vest pocket. ¶No contractor, builder, carpenter, mason, bricklayer, architect or plasterer should be without one. ¶Just stretch your line and hang the level on it—it's positively accurate. ¶The complete outfit is put up in a neat leatherette case and consists of the level with a 40-ft. line, also a spring clamp for attaching the level to a steel square or pocket rule, thereby serving as a plumb rule or bench level. At your hardware dealer's or sent for $1 postpaid.

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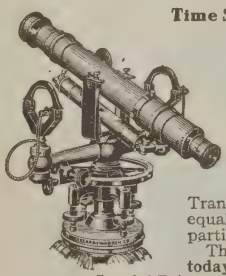
Write for Catalog of Woodworker's Tools

Time Saved Is Money Earned

Use "Sterling" Builders' Levels

And Save Both



The Contractor who prides himself on the Accuracy of his work will tell you that the "STERLING" Transits and Levels are without an equal and will satisfy the most particular.

There is a reason why. Write today for Illustrated Catalog.
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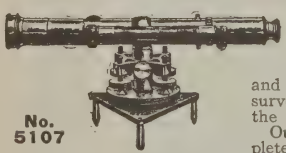

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KEUFFEL & ESSER CO.
NEW YORK, 127 Fulton Street — General Offices and Factories HOBOKEN, N. J.
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NEW BRANCH OFFICE.

We are advised by the Edwards Manufacturing Company, 430-450 Eggleston avenue, Cincinnati, Ohio, that they have established a branch house in Dallas, Texas, 1625-1627 Pacific avenue, where they carry on hand approximately 4,000 squares of ceilings in various patterns, mouldings, etc., and are preparing to keep in stock a complete line of metal shingles, Spanish tile, conductor pipe, imitation brick and stone siding and various other sheet metal building materials.

Mr. J. F. Agnew, who has represented the Edwards Manufacturing Company for the past several years in Texas, will be in full charge of this warehouse and inquiries from that section of the country can be made direct to him.

The establishment of a branch house of this character means prompt shipments over a wide area and it is believed that there is sufficient business in this territory to warrant the establishment of a large branch of this character.

WEAVERS ADJUSTABLE LEVEL AND PLUMB.

Rapidity of construction has been carried to such a point that every man must be a

The New Way

skilled mechanic, competent to lay out work alone and to do a great deal of work on which he was formerly allowed a "helper." The "helper" even, through the use of modern tools, is nearly as valuable a man as the ex-

THE COAST LINE TO MACKINAC

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THE CHARMS OF SUMMER SEAS

Spend your vacation on the Great Lakes the most economical and enjoyable outing in America.

Daily service is operated between Detroit and Cleveland, Detroit and Buffalo; four trips weekly between Toledo, Detroit, Mackinac Island and way ports; daily service between Toledo, Cleveland and Put-in-Bay.

A Cleveland to Mackinac special steamer will be operated two trips weekly from June 15th to September 10th, stopping only at Detroit every trip and Goderich, Ont., every other trip.—**Special Day Trips Between Detroit and Cleveland, During July and August.—Railroad Tickets Available on Steamers.**

Send 2 cent stamp for Illustrated Pamphlet and Great Lakes Map.

Address: L. G. Lewis, G. P. A., Detroit, Mich.

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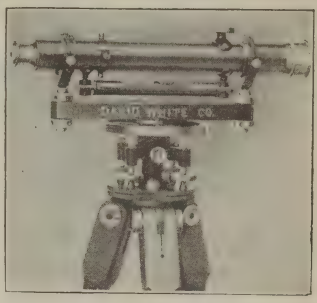
White's IMPROVED LEVEL

Combines Simplicity with Accuracy and Durability. Three features to be found only in WHITE'S LEVEL



We will ship this $45 Improved Level for the next 30 days at $40 prepaid to any address

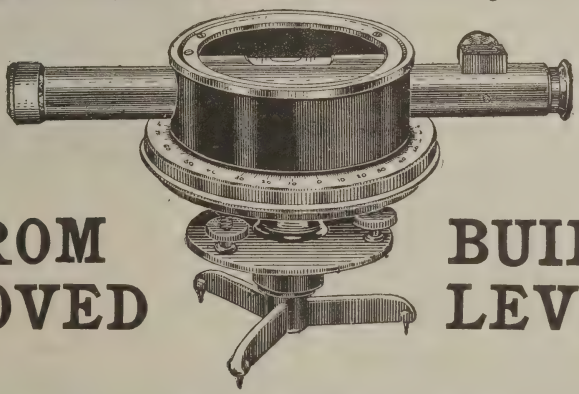
WHITE'S LEVEL is the best for grading, building concrete sidewalks, laying out buildings, leveling, etc. Directions with each level. Examine it upon receipt and if found other than we represent it, return it to us and your money will be refunded.

Write for catalog and complete price list.

DAVID WHITE CO.

421 E. Water St. MILWAUKEE, WIS.

Unanimous Endorsement of purchasers in EVERY STATE and practically EVERY COUNTY in the Union makes it the duty of EVERY MAN who has need for a Leveling Instrument to INVESTIGATE the



BOSTROM IMPROVED BUILDERS LEVELS

whether he is now in the market or not, as the novel elements of construction entering into the **BOSTROM LEVEL** afford **means** for **proving** the **accuracy** of your work which we GUARANTEE is not surpassed in even the most expensive engineering instruments, and that feature when combined with their **simplicity** affords ease and quickness of adjustment and operation which marks the greatest improvement made in leveling instruments during the last quarter of a century.

That Bostrom's Levels fill a long felt want among all classes requiring the use of a dependable instrument, is best indicated by the demand already created throughout the continent which has resulted in our manufacturing in such quantities as to save the purchaser about **one-third** the cost of the old familiar type architect level, as the price of our No. 3 is only $25.00 and No. 4 only $30.00; either outfit, including tripod, graduated rod, target, plumb-bob, etc.—the only difference being in the magnifying power of the telescopes, No. 3 being 10 diameters, and No. 4 being 18 diameters. Prices named are F.O.B. New York, Atlanta, St. Louis, and all Pacific coast cities. Shipping weight 15 pounds.

If not sold in your town, will ship direct on receipt of price; or will ship C. O. D. SUBJECT TO APPROVAL—money back, including all express charges paid, if dissatisfied, or disappointed in any respect after thorough trial. Order direct from this announcement or write for illustrated description. Our reliability guaranteed by this publication.

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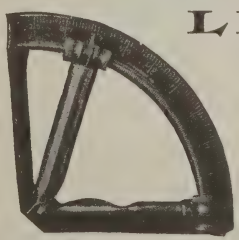

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pert mechanic, as the tools and appliances now on the market assist one man to do nearly the work that two did a few years ago.

One of the jobs formerly requiring two men was that of leveling. One held a straightedge, the other a long level, and unless they worked in perfect harmony the results were uncertain. The same with plumbing a jamb or partition, it was thought one man could not do it alone.

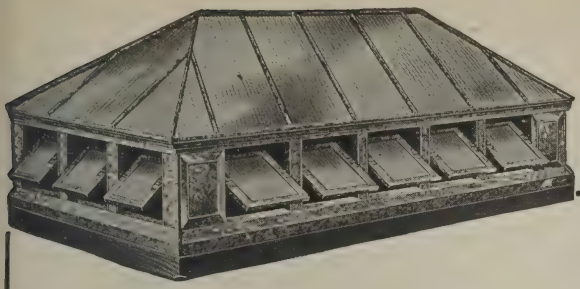
The introduction of Weaver's Adjustable

The Old Way

Level and Plumb convinced mechanics that one man could readily do the work of two in many cases, and do it easier and with greater accuracy. The two illustrations will show exactly the application of the appliance used as a plumb, and the ease with which one man can line up his work. One hand does all the work with the plumb, leaving the other free to manipulate the work, while with the old way both hands and one foot were busy, necessitating taking down the straightedge and plumb while adjusting the work.

No less saving in time is found in leveling. The level is made so that either a perfectly level line is run, or it can be easily adjusted to give a line of any inclination. This facilitates the laying of pipes, drains, cement sidewalks, etc.

Mr. J. D. Weaver, Jacksonville, Ill., is the inventor and manufacturer of this useful tool, and a line to him will bring such further information as may be desired.



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They are shipped knocked down after being set up and tested in the factory, are watertight without the use of putty and designed to give the greatest amount of glass area. The ridge and gutter bars cannot sag, buckle or spread.

Send us your plans or a rough sketch with dimensions and we will furnish working drawings and an estimate. **You can install it yourself.**

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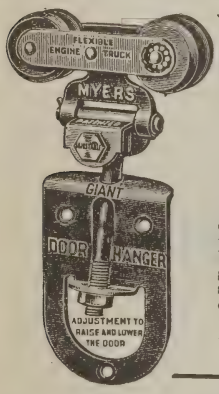

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For Tubular Girder Track

Are adjustable up or down, and in or out. Trolley Wheels are heavy turned steel, revolving on steel roller bearings, and run inside the tubular girder track. Not affected by rain, sleet or ice. Write for descriptive circulars and prices.

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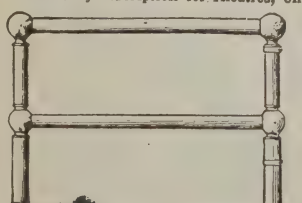

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For Theatre Lobbies.

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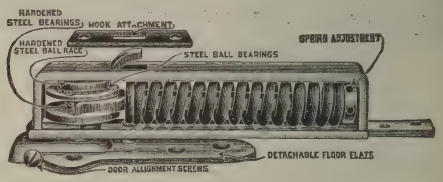
DOUBLE ACTING SPRING FLOOR HINGES.

The use of a double acting door so necessary between a kitchen and dining room requires a hinge which shall do more than merely keep the door closed. It must work



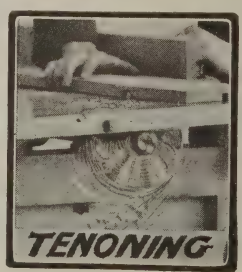
quickly, but smoothly and silently, and be easily adjustable to suit doors of various weights.

The Standard Manufacturing Company, Shelby, Ohio, manufacture a floor hinge which meets exacting demands for a door in this position. We are permitted to show the construction of this hinge, which the manufacturers claim furnishes a neat, powerful, self-acting, supremely simple and hence "fool proof" device for controlling doors that swing in both directions. In the construction of this hinge no soft metal or malleable castings are used, and as will be seen, the weight of the door rests on hardened ball bearings, protected from the dust, dirt and moisture which so quickly grind out the efficient life of improperly constructed hinges.

The latest catalogues of the Standard Manufacturing Company show many other novelties in builders' hardware. These catalogues should be in the reference files of every contractor, carpenter and mechanic.

THE EVEREADY PORTABLE SAW RIG.

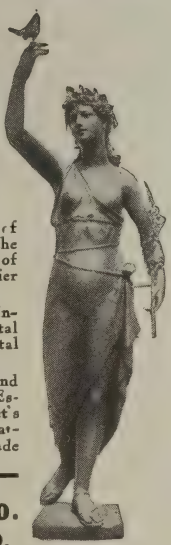
The Oshkosh Manufacturing Company, 414 S. Main street, Oshkosh, Wis., are placing on the market the Eveready Portable Saw Rig. This machine is very completely equipped with devices to do not only the usual cross and rip sawing commonly done on these machines, but also a great variety of work about a shop or building which is usually done by hand. Experience has taught a great many carpenters and builders that it pays to do the bulk of their sawing work on a portable saw rig, as it will handle lumber much quicker and cheaper than can be done by hand, one machine, operated by a carpenter and his helper, doing the work of half a dozen skilled workmen.



But the special utility of the "private planing mill" lies in its ability to do a great variety of work formerly done by many workmen. Many cuts in stair work, for instance, can be

Sheet Metal Statuary of Rare Artistic Worth

WITHIN the last quarter of a century there have been reproduced at the Mullins factory, Salem, Ohio, statues of Sheet Bronze and Copper that are nothing short of marvelous. Many of them were made from the models of famous sculptors, to their entire satisfaction.



We are prepared to reproduce, in minute detail, the most delicate lines of any model. It is this faithful portrayal which helps to account for the world-wide fame of Mullins Sheet Metal Statuary. Diana on the top of Madison Square Garden, the group on the New York Life Building, the Statue of Progress, Chicago, are among our earlier achievements.

We also make Fireproof Metal Windows, Skylights, Cornices, Finials, Metal Tile Roofing and Sheet Metal Ornamental Work of every description.

Tell us what you're interested in and we'll send the proper catalogs at once. Estimates promptly submitted on architect's drawings. Attractive prices. Quick, satisfactory service. Discounts to the trade on application.

The W. H. Mullins Co.
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Sent Complete to a Nail $18.50

Knocked Down, Ready To Erect

Self Retaining Machine. Hardwood Car. Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one.

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Mississippi State Hospital at Jackson, Miss.—roofed with Asbestos "Century" Shingles by the Hospital authorities on the advice of J. T. Willis, Architect and Builder, of Jackson. From an Artist's Drawing.

When you have a call for **red** Asbestos "Century" Shingles, and price is a primary object—suggest the **Veneered Red.**

Asbestos "Century" Shingles

"The Roof that Outlives the Building"

These veneered shingles are made of the standard "Century" asbestos-cement composition.

Their upper weather surface is Indian Red, backed with the regular Newport Gray composition.

They have all the fire-proof, weather-proof and time-resisting qualities that have given Asbestos "Century" Shingles their superior place among roofing materials.

Our nearest representative will supply you.

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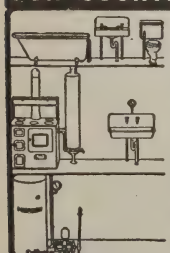

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DIRECT AT
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Send for Big Low-Price Catalog—FREE
Missouri Water & Steam Supply Company
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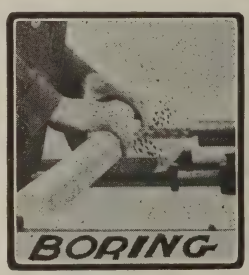
done which formerly required skill and much labor. Such work as cutting maple flooring for pattern or diagonal work is easily accomplished, saving what was formerly a long and wearisome job. Work such as this, with others just as expensive and troublesome, can be done at a very low cost, as the machine is fitted with special attachments to do the difficult or slow-moving "hand jobs" in quick time.

A mitre device of unique design and great adaptability enables the operator to put through the most exacting and tedious mitreing jobs with confidence and speed. The saw gauge which is a part of this device is so adjustable as to permit cutting a bevel of any degree without a chance for irregularity.

Another attachment consists of a dado or groover head, arranged to cut a variety of widths either with or across the grain of the wood. This device facilitates the making of window frames, odd size casement and transom jobs, which formerly were sent to the large planing mill.

Planing can be done on this machine, an attachment being provided which is adjustable for many kinds of work. Jig-sawing, which the jobber frequently meets with, is also provided for, and will be the means of securing many a stray job of repair work, which was formerly passed up on account of the time and trouble it made.



The Eveready outfit also includes a high-grade boring attachment, an improved sander, and an emery wheel for tool-sharpening, as well as the regulation cross and rip saws.

The Oshkosh Manufacturing Company wants to tell every contractor and builder the complete story of the Eveready, as well as their remarkable "guarantee for life." It is, of course, sent free to our readers.

ARTISTIC INTERIOR WOODWORK.

The Chicago Grille Works, 826-836 Wells St., Chicago, Ill., are sending to their old customers their catalogue No. 19, which, with its supplement, shows a complete line of grilles, interior columns, pedestals, consoles, and miscellaneous ornaments. There are so many places about a modern house where an artistic column, bracket or cap can be used to advantage that contractors and builders should study this catalogue with the view of utilizing some of this excellent work in the houses which they plan to build.

"BEEN ON 19 YEARS AND TODAY LOOK AS WELL AS NEW"

Writes Mr. Fein

Gentlemen:—Will say that I have used the Cortright Metal Shingle and I am greatly pleased with them, especially the Victoria Shingle, with which I recently covered two churches here. The shingles are easily put on, and give an artistic appearance and entire satisfaction so far as weather and fireproofing is concerned. We have one roof here, W. Underwood's residence, that has been on nineteen years and today they look as well as new and give the same satisfaction.

Respectfully, JACOB FEIN, *Contractor and Builder.*

THIS CONTRACTOR'S EXPERIENCE PROVES THAT

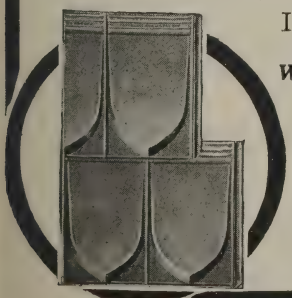
CORTRIGHT
Metal Shingles

Are Easily Applied—Artistic in Appearance—Weatherproof—Fireproof and Last as Long as the Building

Contractors today are realizing more and more what an ideal proposition CORTRIGHT METAL SHINGLES make for public buildings, such as schools, churches, railway stations, etc. On this class of work you make big money, and with so many convincing advantages to offer it is easier to obtain this big business with CORTRIGHT METAL SHINGLES than with any other form of roofing.

Mr. Fein, you'll notice (in his letter above), has used them on two churches in his town.

If he can do it, so can you. Let us show you how.



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RETURN THIS COUPON — Philadelphia, Pa.

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You may send me book "Concerning that Roof" as advertised in National Builder, June 1912.

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State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. WRITE TODAY.

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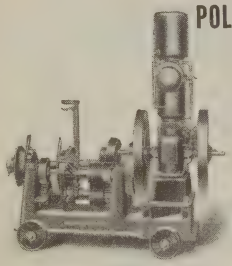

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95% EFFICIENCY

Great lifting capacity in ratio to power. Reverses drum or sheave with engine running one direction. Patent Quadruple Helix Clutch. Cone friction. Cold rolled steel shafting. Semi-cast steel base and standards in one piece. Rigid, durable, simple. Steam, gasoline or electric power. All the advantages of others and then some. Don't fail to investigate the POLYGON before buying a hoist.

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Are simple, compact, absolutely reliable and easy to handle. Sold with or without long frame on which you can mount gasoline engine or motor. A High Grade Hoist at a price that will surprise you. For operating material eleveators, pile drivers, hoisting timbers and general construction work. We furnish our hoists complete with our Economy Portable Gasoline Engines, rope, tackle, blocks, etc., if so desired. They pay for themselves on a single contract.

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ERIE CLUTCH & PULLEY COMPANY
Established 1873 ERIE, PA., U. S. A.

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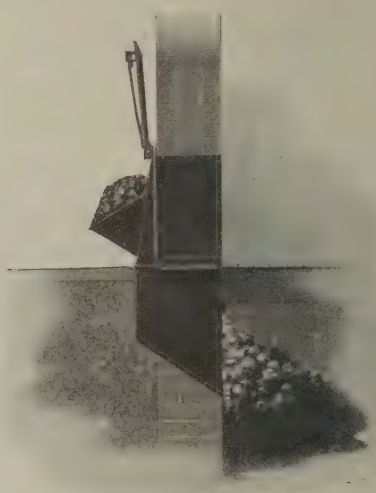
Up-to-date conveniences are now possible in even remote country homes. The use of windmills and pressure tanks have made it possible to install modern plumbing fixtures practically everywhere.

Mr. B. Y. Karol, 768-72 W. Harrison street, Chicago, has on hand a large stock of first-class plumbing materials—pipes, fittings, etc., for work of this character. His recent catalogue shows modern styles at extremely reasonable prices. There is little excuse for doing without modern conveniences provided one has ordinary mechanical skill in installation.

A line to Mr. Karol will bring his catalogue, prices and such other information as may be asked for.

MAJESTIC FOUNDATION COAL CHUTES.

In every building there is occasion for taking in materials, whether it be coal, wood and fuel, or vegetables, ice, and other supplies. An arrangement to permit getting these in must



be secure against intrusion; at the same time be easily opened when desired.

The Majestic Furnace Company, 70-74 Erie street, Huntington, Ind., manufacture a chute of heavy construction, the door and exposed frame being of heavy cast iron and so arranged that when in use the door protects the building from injury. In closing the door, it locks itself, after which it can only be opened from the inside, thereby relieving the coal man of all responsibility for seeing that the door is locked and preventing material being taken in at the wrong place. The cut which we show will give one an excellent idea of the manner in which this chute works.

The Majestic Furnace Company will be glad to send their catalogue showing these chutes, their furnaces, and other building specialties on request.

Don't miss this Opportunity

We want One Carpenter or Builder in Every Community to Demonstrate, Take Orders for and Apply Our EDWARDS METAL SPANISH TILE ROOFING on a Liberal Commission.

Here is a chance to build up an independent, profitable business for yourself right at home. Many carpenters are devoting their entire time to selling our metal roofing. Others have made big profits devoting part of their time to selling and laying our Metal Spanish Tile.

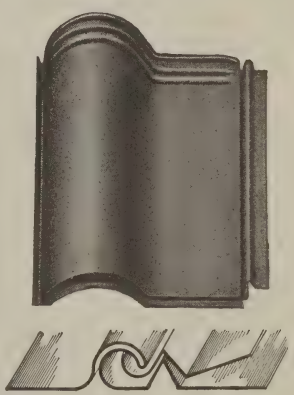
EDWARDS METAL SPANISH TILE

Is being advertised in the leading magazines and is now known to thousands of home builders and owners everywhere. Wherever it has been used it has made a decided "hit" because it shows off to good advantage on the roof and has numerous points of superiority over any other style of roofing.

Architects are specifying Edwards Metal Spanish Tile, for they know it will do away with roofing "troubles." Builders like it because of the finished appearance it gives any house on which it is used.

Our Metal Tile are stamped out of the highest quality Worcester terne plate in exact imitation of the most expensive Terra Cotta Spanish Tile. They come either "dip" painted or heavily galvanized, size 10x14 inches. Our patented interlocking side lock makes it possible to make a perfectly moisture-proof roof without soldering. Edwards Metal Spanish Tile afford the fireproof advantages of Terra Cotta Tile, but are much lighter in weight, cost but a trifle more than ordinary roofing and will last a lifetime.

WRITE US TODAY ABOUT YOUR TERRITORY. Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that someone else will be given your territory. DON'T DELAY. WRITE TODAY FOR OUR SPECIAL AGENTS' PROPOSITION.



Note the construction of patented interlocking device, protecting nail heads from weather and providing perfectly for expansion and contraction of the metal.

The Edwards Manufacturing Co.

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430-450 Eggleston Avenue **CINCINNATI, OHIO**

The World's Largest Metal Roofing, Metal Shingles and Metal Ceiling Manufacturers.

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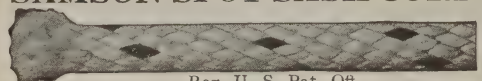

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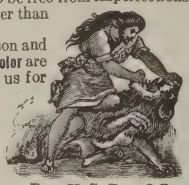
is the best that we can make after forty years' effort. It is guaranteed by the Samson Cordage Works to be free from imperfections of braid or finish, and it will last longer than any other device for hanging windows.

Our trade mark on the label is Samson and the Lion **in any color.** The Spots **in any color** are our trade mark on the cord, used by us for 18 years to show, after the label is removed, who guarantees the quality of the cord. You recognize either of these marks by the design, not the color. Don't be misled by imitations.



Samson Cordage Works, Boston, Mass.

Reg. U. S. Pat. Off.

MR. CARPENTER AND BUILDER! WHY NOT MAKE some extra money?

by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **Rolling Ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary to send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

Write For Catalogue

Milbradt Manufacturing Company

1442 N. Eighth Street ST. LOUIS, MO.

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FREIGHT ELEVATORS
PAVEMENT LIFTS

Easy to Erect and Easy Running

J. G. SPEIDEL
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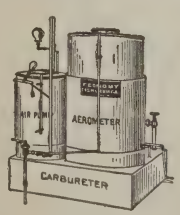
Catalogue Upon Application

Automatic Safe-Sanitary Gas Light and Fuel



Best for cooking and heating water for kitchen, bath and laundry.
No charging, no cleaning.
No generating, no dirt, soot, fuss or muss.
Cheaper than electricity, cleaner and safer than kerosene or acetylene (in use 16 years.)

Today is the time to write HOME department of

ECONOMY GAS MACHINE CO., 437 E. Main St., Rochester, N. Y.

STONEKOTE.

The use of exterior plaster, cement, etc., requires some form of waterproofing in order to make the walls perfectly impervious to moisture. The same preparations which are used to waterproof the surface should also be in colors to give whatever artistic effects are desired by the owner or builder.

The Garden City Sand Company, 709-711 Chamber of Commerce, Chicago, Ill., are the manufacturers of a material known as Stonekote. This material is of such a nature that it can be used on any cement, stucco, brick or masonry surface and through its use the surface is rendered absolutely impervious to dampness, acid or such chemicals as usually attack exterior surfaces.

The Garden City Sand Company will be very glad to send information regarding Stonekote to those who write for it.

UNITED STEEL SASH.

Whenever an absolutely fireproof building is desired, the first thought is of the window openings. Light must be provided, but it is through the windows that a large number of fires are spread.

To overcome this difficulty, the Trussed Concrete Steel Company, 384 Trussed Concrete building, Detroit, Mich., have designed steel sash for use in factories, warehouses, and other places where absolute protection from fire is desired. Their latest catalogue shows the construction of the bars and other parts of this sash, as well as the various stock sizes in which it can be supplied.

Those who are interested in this kind of construction should see the many excellent examples of work erected with this sash, and it is more than likely that the manufacturers can direct them to buildings in their vicinity where it has been used. In this way the contractor or builder can see exactly how it is installed and how well pleased the customers are with the product.

NEW WALL SURFACES

Modern methods of construction have materially altered the procedure in architecture and building. Where formerly the plastering required several weeks of the construction of a small building and several months in larger buildings, now, this time can be, and in many cases is, saved.

To do this, it is only necessary to utilize the modern wall covering, of which Bishoporic wall board is one. This wall board is made of a heavy artificial board impregnated with asphalt mastic on the back of which is embedded wood lath, adding strength and stiffness to the board.

This board is made in large sheets, which can be readily cut to any desired size or to fit any odd shapes and sizes such as stair soffits, attics, etc. The wall board can be put up at any time by any mechanic.

Plastered walls can be properly made only in "good building weather," and by skilled

POINTS OF SUPERIORITY
in
Copper Bearing Open Hearth Steel Ternes

Thorough amalgamation between the base plate and coating —
Even distribution of coating—
Soft and ductile—
Carefully assorted—
Accurately resquared—
All of which contribute to
INCREASED DURABILITY

Send for a free sample and see for yourself. Write for full information and quotations on our high grade Terne Plates, Continuous Roofing Tin, Black and Galvanized Sheets, Formed Roofing and Siding Products, Metal Lath, etc. Send for our book, "Better Buildings,"—valuable to every builder.

American Sheet and Tin Plate Company

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We Want the Man Who Knows

good architecture and wants modern, up-to-date plans to send for our new book

"HOMES OF CHARACTER"

which contains plans, descriptions and accurate cost estimates of 40 artistic and practical Bungalows, Cottages and Houses. This book is full of new ideas for the wide awake contractor or home builder. **Send postpaid for $1.00. Descriptive Circular 2c.**

JOHN HENRY NEWSON (Inc.), Architect
1238 Williamson Building Cleveland, Ohio

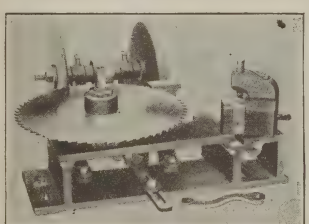
HAVE YOU POWER BORING MACHINES?

IF SO, No Sash Pulley Can be Classed with the **Grand Rapids No. 12** Mortised at one Punch with the **Quadruple Bit** or bore four holes with a single bit and it's done.

No cutting, fitting nor trimming. Saves time and money. Write for Free Samples.

Quadruple Bit, Price $5.00 Can not be used in a hand brace.

Grand Rapids Hardware Co.
118 Pearl St., Grand Rapids, Mich.



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Is a big money saver for Contractors, Builders and Millmen. An inexperienced ordinary mechanic can

Gum, Joint, Set and Sharpen Circular Saws Easily and Perfectly

¶ The Conrad 14 inch machine handles saws from 5" to 24" in diameter and occupies only an 18 inch square.

¶ Price so low no one can afford to send saws away for repairs.

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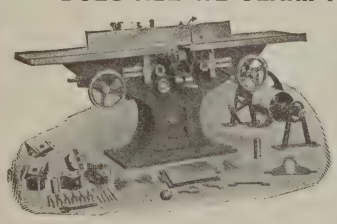
H. G. CONRAD, 709 So. Clinton St., Chicago, Ill.

OUR ROYAL STANDARD UNIVERSAL WOODWORKER
DOES ALL WE CLAIM FOR IT



Send for booklet showing how to operate a machine correctly for sawing, dadoing, grooving, rabbetting, tenoning, jointing, matching, molding, etc. Our Royal Standard Universal Woodworker is the best machine for this work made.

CORDESMAN-RECHTIN CO.
210 Butler Street CINCINNATI, OHIO

workmen. Then there is the long wait until the walls "dry out" before they can be decorated.

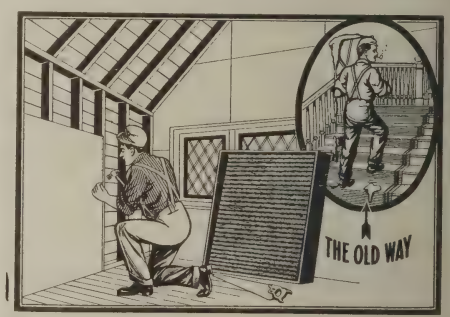
Whether brand new or old, plastered walls are liable to crack or crumble—vermin lodge in them—they fall rapidly in case of fire—and any vibration or shock makes them a menace to the lives of those near.

Remodeling a plastered house has always been a bugbear both to the builder and to those attempting to live in the house while the work was going on.

Many a house owner has done without desired changes simply because of the unbearable nuisance of having old plaster dragged out or new plaster dragged into his house.

Asphalt-Mastic does not burn. It makes a fire-resisting wall.

Bishopric Wall Board is nailed to the studding—a nail through each lath—so that it is held absolutely rigid through all changes of temperature, "settling" of the building, leaks of roof, steam in kitchen or laundry, etc. It is air-tight and moisture-proof. Makes the warmest of buildings in winter and coolest in summer. Rats and mice cannot penetrate it—the asphalt-mastic coating gums their teeth, and causes them to seek other haunts. And another good thing is that Bishopric Wall Board is a sound deadener to a remarkable degree. It is easily put on, for it comes in sheets four feet square, and a whole room—walls and ceilings—can be quickly handled and finished by anyone who can drive a nail. The sheets meet evenly at the edges, forming a smooth surface over the entire wall.



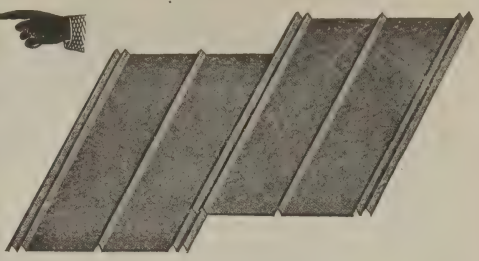
The Old Way and the New.

As soon as Bishopric Wall Board is nailed in place, it is ready for any kind of decoration. Paper, paint, frescoing, burlap—anything that is used as a wall decoration. The wall board itself is of a soft silver gray, dull finish, and when the joinings at the edges are covered by thin strips of wood nailed on, the result is a paneled wall of the greatest artistic beauty, endless durability, and most moderate cost.

By using Bishopric Wall Board, it is a quick, clean, easy, and inexpensive matter to partition off a cozy bedroom in the attic—or a separate storage room in the basement—or change a room or hall in any part of the house. For rougher use than inside walls, the same company makes Bishopric Sheathing. This is

"Justright" Galvanized Roofing

APTLY NAMED

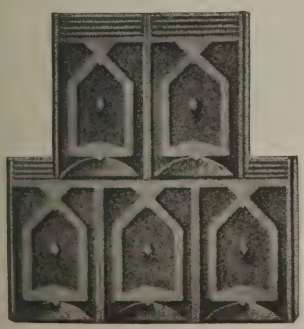


That Simple Roof That Don't Leak

¶ No Wood Strips Required. ¶ Adapted for Residences, Barns, Warehouses, Garages and buildings requiring fireproofing. ¶ Made in all lengths to meet requirements.

STANDARD Lock-Joint METAL SHINGLES

Are the **quickest laid** shingles made, Mr. Contractor and Builder, and they give absolute satisfaction and service. These are proven facts, and don't ignore them. ¶ Our metal shingles are made in either **Painted Tin or Galvanized.** They are twice as quickly applied as those of any other make. In using them you are saving time, and saving time means saving money. Can you afford **NOT** to investigate them? ¶ Our Standard Lock-Joint Metal Shingles have a continuous seal at end of side-lock. It is impossible for rain, snow or sleet to blow up under them. Ours is the only shingle made having this feature. And they lock—lock so that they will always keep in one, and only one position, contraction and expansion being provided.



Let us send you our general instruction roofing booklet. You'll find it very handy to have, and it explains all about our Standard Metal Shingles. Drop us a line about it. It's free. Further: We have an ATTRACTIVE PROPOSITION to make to Contractors and Builders in territory in which we are not represented. Write us regarding terms, etc.

The Moeschl-Edwards Corrugating Company

9th Street, Covington, Ky., (Opposite Cincinnati)

Sheet Metal Building Material, Interior & Exterior

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The Extra Strong Tongue and Groove.

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Stands for Good Grades—Perfect Manufacture—Thorough Kiln Drying—Reliable every way and the easiest to lay. XLCR Flooring is the result of thirty-five years experience manufacturing. *Prepaid Free Sample Sent on Request.*

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Comfort : Convenience : Economy

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Made up to your exact specification as to size, thickness, kind of wood required.

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You will like our high class materials and workmanship. We carry a large stock of kiln dried lumber in both soft and hard woods, and can get orders out promptly.

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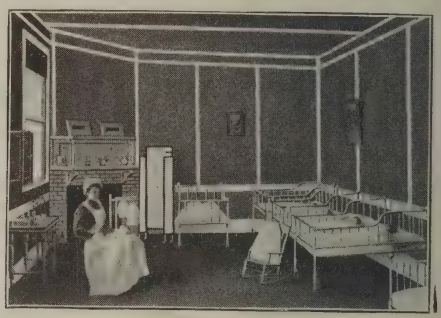
Let's get together now—We know we can please you.

Harty Bros. & Harty Company
21st Place & Loomis St. Chicago, Ill.

exactly like Bishopric Wall Board, only it is not so finely finished.

Bishopric Sheathing is being widely used for the walls of garages, barns, stables, poultry houses, milk houses, and other farm buildings, and under flooring in houses and buildings of all kinds, where protection from cold, heat, or dampness is desired; or sounds are to be hushed. If this sheathing is nailed to the joists overhead in the cellar, the rooms above will be made warm and dry and comfortable on far less fuel than was before necessary.

This sheathing is also in great demand as a foundation for outside stucco work or cement

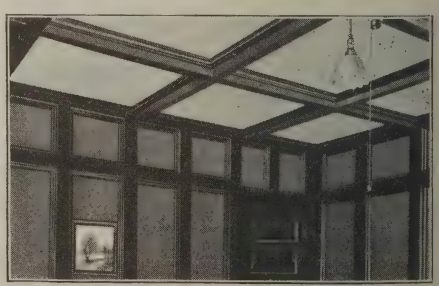


A Comfortable Hospital.

work. It forms an air-tight, moisture-proof, fire-resisting wall—and the rough lath is an unexcelled foundation for holding rigid the cement coat.

It is estimated that fully a month's time is saved in building a house, when the builder uses Bishopric Wall Board and Bishopric Sheathing in place of the old-time, slow-drying lath and plaster.

Further than that the owner of the building is continually pleased with the many advantages gained, and is quick to commend the good judgment of the carpenter who advised the use of Bishopric Wall Board.



Panelled Walls and Ceiling.

Bishoporic wall board is made by the Mastic Wall Board & Roofing Co., 340 Este Av., Cincinnati, O., and the manufacturers will be pleased to send catalogues descriptions of the board and samples together with a recently issued art calendar. This offer should appeal particularly to our readers.

Residence of E. A. Wall, U. S. A.
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R. Kletting, Architect
BUILT OF METAL LUMBER

Berger's Metal Lumber

Makes possible a positively fireproof and shockproof structure. It is inexpensive, practical and is easily erected. The simple erection drawing enables any inexperienced mechanic to do the work.

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are explained minutely in our new catalog, **"METAL LUMBER."** It tells you what it is, how it is made and how shipped. It gives illustrations of many prominent buildings and residences throughout the country in which it has been used. Send for one.

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For prompt shipment write nearest branch
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Fire, Water and Lightning Proof

Finest in Appearance
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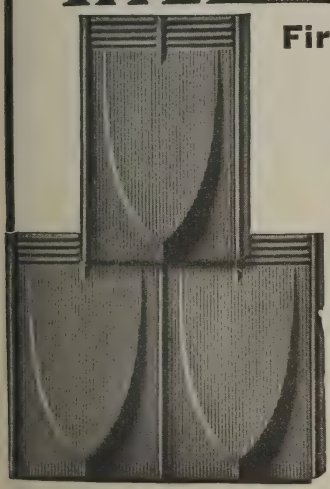
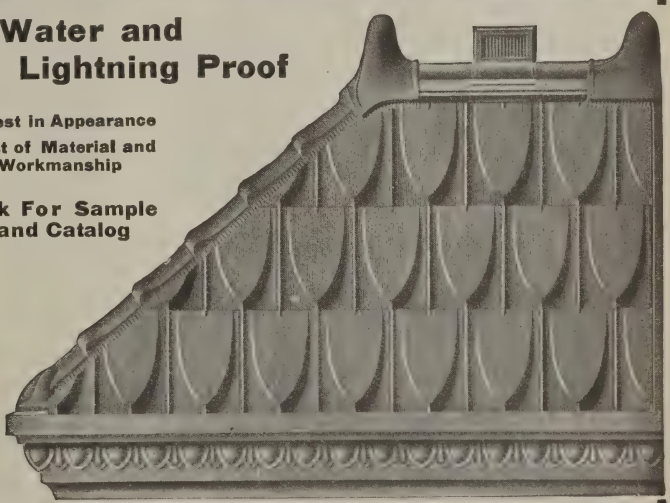


STYLE B. Showing Method of Laying.

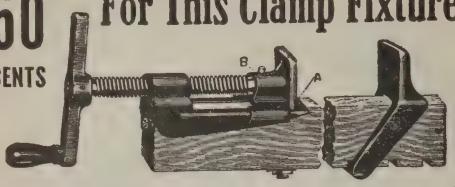


STYLE B. Showing Ridge and Hip Finish.

MILWAUKEE CORRUGATING CO.

Kansas City, Mo. Milwaukee, Wis.

50 CENTS For This Clamp Fixture



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Write for catalog of Sheldon's Clamps and Vises

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The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalog. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book, "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

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ARE QUALITY GOODS

Reject Substitutes. The Springs Never Go Lame

Spring Hinges lead the strenuous life in Builder's Hardware; no other article in their line endures such wear and tear; therefore don't err in judgment, use BOMMER SPRING HINGES; they stand up to their work.

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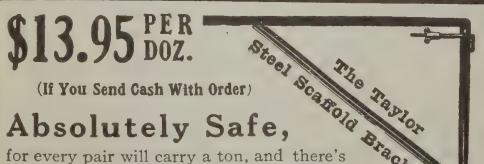
Absolutely Safe,

for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.



Write for Catalog of Builders' Specialties

James L. Taylor Mfg. Co.

Poughkeepsie, N. Y.

TOOL GRINDING FACILITIES.

It is surprising how few contractors, mill men and mechanics realize the cost of individual tool grinding. One case in a large pattern room connected with a manufacturing concern is a notable example. In this room is a 24-inch grindstone which is arranged to be operated by foot power, although the size of the shop would justify the use of first-class grinding machinery run by power from the central plant.

There is no comfort for the man who is obliged to turn a heavy grindstone, either by hand or foot power, to sharpen his tools. The use of another man or boy to turn the stone is almost as bad, as the labor cost is doubled, saying nothing of the time lost in finding the extra man or waiting for the other men to get through with their sharpening. The labor required to turn a heavy stone keeps the workman from giving his whole attention to the edge he is trying to get, and he cannot hold the tool in one position long enough to get a true cutting edge.

There is not a well sharpened tool in that pattern-room. Every chisel and plane bit is ground at an angle for working brass rather than soft wood. The wood turning-lathe tools were all simply impossible. The patternmaker is prone to scrape wood anyway, when he gets it in a lathe, and it is certain that these tools would act in no other way.

The effect is felt in every pattern turned out in that room. The men are spending much time whetting planes and chisels, trying to make them cut decently; more time is spent in making poorly sharpened tools cut at all, and the operations of accuracy, so necessary in the pattern shop, are made much more tedious and more uncertain. When a rush job is brought in, it is always necessary for the patternmakers to stop and try to put tools into condition before they can even attempt the work. It is safe to estimate that the lack of proper grinding facilities costs the owners at least $150 per man per year.

The Luther Grinder Mfg. Co., 719 Michigan St., Milwaukee, Wis., have made a specialty of grinding machines for individual use. Among the line which they manufacture are grinders of various styles and sizes, which can be operated by foot or hand power, or if desired, by any power in use in the shop. The grinding material is either a form of carborundum or their celebrated Dimo-grit, which has unusual qualities as a cutting material. By the use of these wheels, tools can be quickly sharpened without drawing the temper, and thus the tools kept in perfect condition.

Where only a slight amount of work is required to keep the tools in order, the mechanic will generally have tools in first-class condition. The Luther Grinder Mfg. Co. will send circulars regarding their machines to our readers and explain to them individually how they can save time and money by the use of the Luther products.

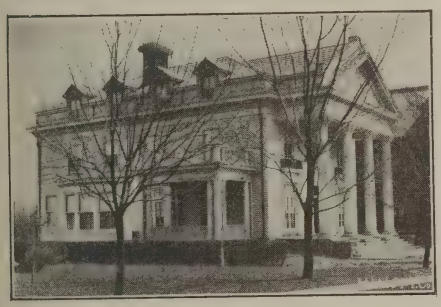
Four of the Many Representative Residences Roofed with

Residence of C. B. Manville, Pleasantville, N. Y.
Betts & Hosmer, Milwaukee, Wis., Architects

Residence of L. Dagameons, Ridgewood, N. J.
Ridgewood Development and Const. Co., Bldrs.

J-M TRANSITE ASBESTOS SHINGLES

The Standard of Shingle Roof Construction



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add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.

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DO STAY LOCKED

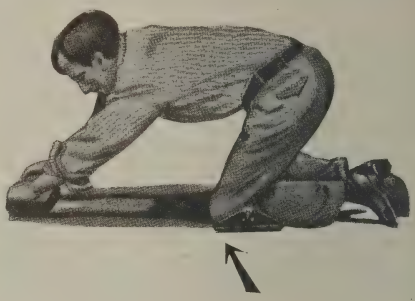
They cost no more than those flimsy, shapeless stock columns some dealers may try to sell you.

Write today, the book is free

AMERICAN COLUMN COMPANY
DEPARTMENT A BATTLE CREEK, MICHIGAN

KNEEMATICS.

When a full-grown man has to get down on his knees to scrape a floor, or for any other work, it is likely to leave dents in his knee-caps and aches in his back which will be remembered for many a day. To make life



easier for those who have to work on their hands and knees "Kneematics" were invented.

"Kneematics" are made to fit the knee perfectly. They are made of the finest and toughest leather fitted with heavy inner tubes. A pocket pump goes with each pair of "Kneematics" and each knee protector is inflated the same as one fills a pneumatic tire.

"Kneematics" weigh only six ounces, but they are large enough and strong enough to make a perfect air cushion for the heaviest person.

"Kneematics" are being offered for sale by the M. M. M. M. Co., Inc., Main street, Marshalltown, Iowa, who will send circulars, prices, etc., to those who write for them.

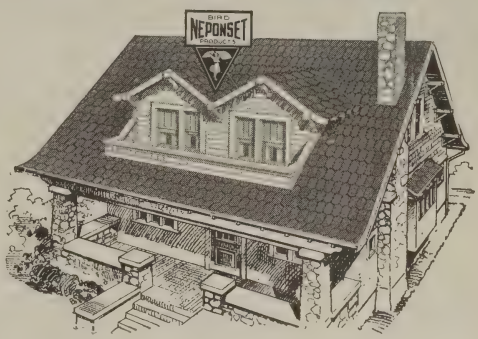
$20 THERMOSTAT FREE.

As a special inducement to prospective purchasers of heating plants to close up their contracts during the next two months, the Andrews Heating Company, 1287 Heating Building Minneapolis, Minn., offer with each plant, free, a $20 Andrews Hired Man Thermostat. This thermostat is fully guaranteed in every way, and completes a heating plant so that it requires no attention save for putting in coal and taking out ashes. The Andrews Hot Water Heating Systems are built to order to fit the individual requirements of each job and are particularly well adapted to contractors' use, as estimates and complete installation plans are furnished by Andrews, and the plants are cut to fit all ready to be installed by a carpenters' helper or any man handy with tools. They are exceedingly economical of fuel and give the best of satisfaction. Andrews sells them on 365 days' free trial, guaranted by bond.

If you are interested in a thermostat only, write for special terms to contractors. There's good money made in installing these regulators in your jobs. Andrews Big Book tells all about the various Andrews Systems and it is mailed free to anyone interested.

NEPONSET PROSLATE ROOFING

Attractive—Protects against fire, wears like best shingles. Moderate in cost. Made in red and green colors. Easily laid in 18-inch strips—special fasteners. **Not a single nail hole exposed to the weather.**



Write us today for our special proposition to carpenters and builders. You make a profit on the material and on the work.

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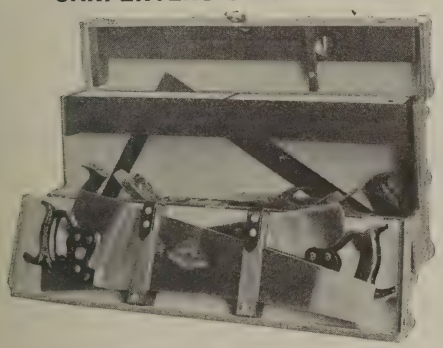
Don't Lug a Heavy Tool Box Around But

CARRY YOUR TOOLS IN THE INDESTRUCTO
CARPENTERS'S TOOL CASE



It is made in suitcase style—of three-ply veneer, covered with strong canvas and painted, all edges bound in steel, reinforced corners, secure locks and catches and strong handle. The Indestructo is the handsomest tool case manufactured. It is light, very strong, and the inside is so well arranged with separate compartments for saws, planes, level, square, chisels, bits, etc., that the cutting edges cannot be injured. Tools can be quickly found and put away. It is made in two lengths, for 26 and 28 inch saws. Special sizes to order. Send for prices.

Agents Wanted

WEDELL & BOERS, Sole Manufacturers
157 Jefferson Ave, Detroit, Mich.

The ROWE Sanitary Lavatory

Running Water Without Costly Plumbing

Just the thing for country homes and summer cottages. Anyone can put it up. Nothing to break—Nothing to rust—Nothing to get out of order—Easily cleaned—Absolutely Sanitary—Cannot slop over—Occupies small space upon the wall—Goes in any part of any room.

Price, **$16.50** delivered.
Either quartered-sawed oak, white enamel or mahogany finish.

THE ROWE SANITARY LAVATORY CO.
50 Larned Street **DETROIT, MICH.**

THE PERRY LUMBER RECKONER

ESTIMATING ERRORS ELIMINATED

Mistakes are impossible with the Perry Lumber Reckoner, as all the figuring is done for you.
The lumber tables give the number of board feet in any number of pieces, from one to a hundred, for all the commercial sizes of lumber. You can turn instantly to the right page. Ask your bookseller about it, or send direct.

Price, Prepaid $1.00

BENJ. L. JENKS, Pub.
906 Williamson Bldg., Cleveland, O.

The Red Book Series of Trade School Manuals

By F. Maire, Director of the Chicago School of Painting, Decorating and Paperhanging. 6 volumes. Illustrated.
(1) Exterior Painting, Wood, Iron and Brick. (2) Interior Painting, Water and Oil Colors. (3) Colors, What They Are and What to Expect from Them. (4) Graining and Marbling. (5) Carriage Painting. (6) The Wood Finisher. The arrangement of the above volumes is such that the student is gradually advanced upon the branches treated and the questions at the end of each lesson will become an index of reference which he will find useful. Instructors will surely welcome these valuable manuals, as they will save them numberless repetitions. The student who cannot leave home to attend a school will find his task of learning the various branches treated greatly facilitated by procuring these volumes. Cloth, each, postpaid.....$0.60

Hodgson Book Company 539 S. Dearborn St. Chicago

143 Cities Used **"STONEKOTE"** Rough Cast In 1911

M.C. Clapp Res., Wichita, Kan.

Before you build or repair the old home have your architect write us for book telling of "Stonekote" Portland Exterior. What color would you like a sample to be; Gray, Silver Gray, White, Buff, Red, Brown?

THE GARDEN CITY SAND COMPANY
MANUFACTURERS
709-11 Chamber of Commerce CHICAGO, ILL.

THE STEEL SQUARE

Two Volumes. A practical treatise on the use of the Steel Square. By Fred T. Hodgson. 600 pages, 500 illustrations. The author was the first—really the only—to write on this important tool, and the two volumes contain the easiest as well as the latest method of using the **Steel Square** for the solution of the many problems in building construction. The two volumes are of the greatest value to the young carpenter. Single Volume, Part I, cloth....$1.00
Part II..... 1.00
Two Volumes..... 2.00

Postpaid at These Prices

Hodgson Book Company
539 S. Dearborn St., Chicago

EXTENSIVE ADDITIONS TO THE SIDNEY TOOL CO. PLANT.

We are advised by the Sidney Tool Co., Sidney, O., that the large increase in their business necessitates their erecting a two-story addition to their factory for use as a warehouse, crating room and paint room. This will increase their output about one-third.

We are very glad to note that business is so good in the machinery line, and we are compelled to believe that the increase is largely due to the excellent machines put out by this company.

STANDARDIZED REINFORCEMENT BLUE BOOK.

The blue book of the Pittsburgh Steel Products Co., Pittsburgh, Pa., has been prepared to enable engineers, architects, contractors and builders to design concrete structures in accordance with sound theory and the best practice, without laborious mathematical complications. The girder, beam and slab tables have been computed so that under dead and live loads the tensile stress in the steel is brought within the limits suggested by the highest engineering experts. The tables given were prepared from formulas recommended by the American Society of Civil Engineers, American Society for Testing Materials, American Railway Engineering & Maintenance of Wav Association, and the Association of American Portland Cement Manufacturers.

This book presents data especially applicable to the products of the Pittsburgh Steel Products Co., and contains a vast amount of valuable information to one interested in concrete construction. There are also numerous tables for general construction work, which every contractor and builder has occasioned to refer to.

We are advised that this valuable book, which is really a hand book on modern construction, will be sent free when THE NATIONAL BUILDER is mentioned.

LEADER STEEL FURNACES.

When the Hess Warming & Ventilating Co. 907 Tacoma Bldg., Chicago, Ill., first started to advertise in THE NATIONAL BUILDER, it was looked upon as an experimental method of selling furnaces. The idea of selling direct to the consumer was not generally believed in, and it was with some hesitation that the order for advertising was first given. No one of our advertisers, however, has been better pleased with the results than the Hess Company, as their continuous advertisements with THE NATIONAL BUILDER would indicate.

At the time of running their first advertisement, a four-page folder was the only literature they had, and it was considered that it would be sufficient as it was expected that

Know the make-up of roofing you lay

On the make-up depends how long it will last, and how little it costs you in the end.

Genasco
THE TRINIDAD-LAKE-ASPHALT
Ready Roofing

is made of genuine asphalt, produced by Nature in Nature's slow, sure way. It has life that lasts, and is the most economical roofing in the end.

Comes in rolls with either mineral or smooth surface. Ask your dealer for Genasco. Write us for the valuable Good Roof Guide Book and samples—free.

The Kant-leak Kleet, for smooth surface roofings, does away with cement and prevents nail-leaks.

THE BARBER ASPHALT PAVING COMPANY

Largest producers of asphalt, and largest manufacturers of ready roofing in the world

PHILADELPHIA

New York San Francisco Chicago

Winthrop Asphalt Shingles are Tapered.

Kindling Wood Never Did Make a Good Roof

The constant fire menace makes an inflammable roof a mighty expensive proposition—

WINTHROP
ASPHALT SHINGLES

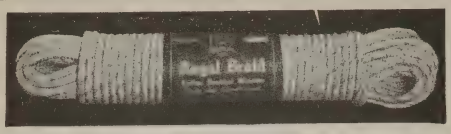
Are made of solid asphalt—tapered by a patented process with the thickness and weight on the exposed butt of the shingle, where it is needed. Surface is covered with chipped slate, rolled into the asphalt until it becomes a part of it. Natural colors—Red, Green and Gray.

Winthrop Shingles are uniform size—Easy to lay—Absolutely weather proof and ALMOST everlasting.

SEND FOR FREE SAMPLES

The Winthrop Asphalt Shingle Co.

No. 10 Sixty-first Street :: :: ARGO, ILL.



Regal Sash Cord is always marked with **Two Blue Strands.**

This sash cord has been approved by the United States Government and many leading architects. It will outwear the best chain 3½ times. It is perfect in construction and, therefore, without waste. *Send for the surest test, that made by the Government, and for free samples.*

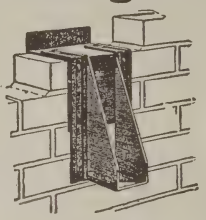
Puritan Cordage Mills

1560 Story Ave. **Louisville, Ky.**

Van Dorn's Steel Joist Hangers

Have no Equals

Send for Catalogue



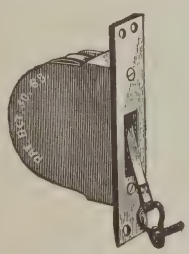
No. 1. Steel Joist Hanger for Wood Header.

Van Dorn Iron Works

Cleveland, Ohio

No. 4. Steel Joist Hanger for Brick Walls

Caldwell Sash Balance



Does away with weights and cords and **vastly** more durable. Makes sashes work perfectly. Permits greater window space in new work, as box frames are not necessary. May be applied to old windows without altering sashes or frames.

Write for Circular to the

Caldwell Mfg. Company

2 Jones Street Rochester, N.Y.

TO KEEP OUT DAMPNESS

Paint Your Concrete and Brick Buildings with TOCH BROS.

R. I. W. PAINT

"Remember It's Waterproof"

and your cement floors with **TOCH BROS. Cement Filler** and **Floor Paint,** Pat'd. Proof against Water, Acid, Fumes or Alkali. **Special elastic compound for each specific purpose**

The Garden City Sand Co.

709-711 Chamber of Commerce, Chicago

a considerable percentage of the furnaces would give trouble and come back to them, not through any fault of the furnace, but because people generally might fail to install and operate them properly. During the ten years that they have sold furnaces in this manner, however, not to exceed six furnaces have been returned, which is surprising as they send these furnaces out on trial. The furnaces are shipped, freight charges paid, and the purchasers money stays in the hands of his bankers, until the furnace has been set up and tested during at least two winter months.

The premises now occupied for making these furnaces is just ten times the space when their first advertisement was placed in THE NATIONAL BUILDER and their business requires further extensions, which they are now planning.

We are advised by the Hess Company that their improved facilities will permit them to make improvements in their furnaces without additional cost to the buyer. Among other things they make an extra heavy furnace for use in damp basements, where some would think that the ordinary material was too light. These furnaces are furnished without any additional cost over the regular rates.

The booklet which the Hess Warming & Ventilating Co. is getting out is more than a catalogue. It is intended to promote the sale of their furnaces, but it is also a reliable handbook for the planning and installing of furnace equipments of any make or character, and as they furnish them on request to anyone, we would suggest that those contemplating purchasing furnace equipments in the near future send for it, and be posted on the entire subject of furnace heating.

THE NORTHWESTERN AND MIRACLE CONSOLIDATION.

What is considered to be the largest deal ever consumated in the history of the concrete machinery manufacturers—in importance of the transaction—the money involved and in the interests affected, is the consolidation of the Miracle Pressed Stone Co. of Minneapolis, Minn. with the Northwestern Steel & Iron Works of Eau Claire, Wis. for the manufacture of concrete machinery and tools.

Both concerns are very well known, do an enormous business and enjoy a high reputation among concrete workers and contractors both for the quality of their products and the excellent service they render. One can gather an idea of the immensity of the transaction from the fact that this consolidation will give them the distinction of being the largest makers of concrete machinery in the world.

The Northwestern line has been established for the past decade and its concrete making machinery and tools are used in every country on the globe where concrete work is the form of construction. It meets the big demand for medium priced machinery and is considered to be the most complete line on the market

Doesn't That Beat Lath and Plaster!

Attic Turned Into Model Nursery by Bishopric Wall Board

Add 600 to 1,000 Square Feet Floor Space to Living Room

The picture below is the old-fashioned family junk room, the attic—useless, as it stands, for living-room purposes.

Such is the attic of 90 per cent of the dwellings today—a sheer waste of good space.

The picture above is a beautiful, up-to-date nursery—made of this same attic with a few dollars' worth of Bishopric Wall Board.

The attic can be transformed into equally beautiful bed rooms, den, studio or billiard room just as easily and at just as little expense.

More room is the demand of the big majority of house owners. Thousands would enlarge their homes at once if they could afford it.

Show them that they already have the room. Show them how they can have just as handsome rooms in the attic as the one illustrated, at one-tenth the expense of enlarging the house. You will find more business in your community than you can attend to. And it is very profitable business, too.

With Bishopric Wall Board a room can be made just as easily and as quickly in any part of the house. No mess. No dirt. No dampness.

Bishopric Wall Board comes in sheets 4 x 4 feet square. All ready to put on. Goes on dry. Wall Board is ready at once for paint, paper, burlap or any wall decoration. Used in every kind of building from skyscraper to garage.

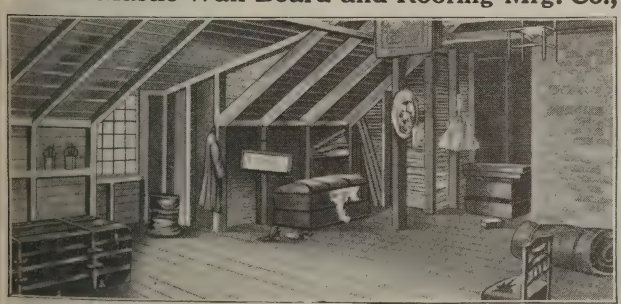
Contractors and Builders:
Send for Wall Board Book in Colors

Scores of uses for Bishopric Wall Board are shown in a splendid new book of Home and Building Plans. Complete set of Architect's Working Plans for model home comes with book.

Send 6c in stamps for mailing. Generous sample of Wall Board sent free.

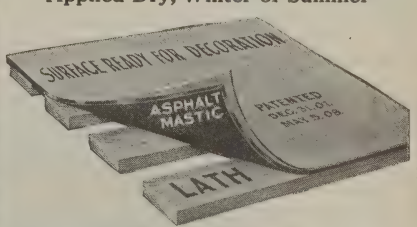
Dealers, write for attractive proposition.

The Mastic Wall Board and Roofing Mfg. Co., 324 Este Ave., Cincinnati, Ohio



The Old Attic

Applied Dry, Winter or Summer



Shows Construction of Bishopric Wall Board

BISHOPRIC WALL BOARD AND SHEATHING

See Our Ad on Page 3

The GALE WALL SAFE

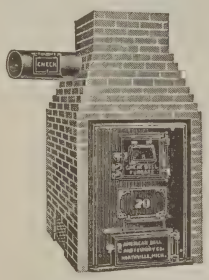
It makes your Valuable Papers, Jewelry and Silver secure against Porch Climbers, Petty Thieves, Fire, etc.

No Home or Apartment House complete without one. It has a combination lock.

Write for Descriptive Matter Today

WILLIS MFG. CO., Galesburg, Ill.

FRED LIEBRICH, Agent for Cook County
1102 Monadnock B dg., CHICAGO, ILL.



A Hot Air Furnace

For Less Than $50 Complete
FOR 5 AND 8 ROOM DWELLINGS

An unheard of Price and a most Remarkable and Indestructible Furnace. No Pipes—no Lost Heat.

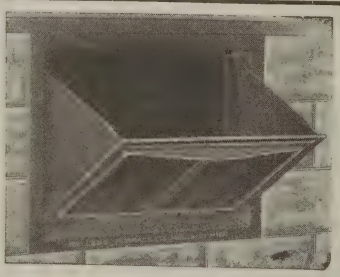
American Bell & Foundry Co.
NORTHVILLE, MICH.

The Improved Window Chute

A Real Glass Window when closed, which is burglar proof

A Perfect Coal Chute
when open

LOCKS FROM OUTSIDE AND CAN ONLY BE UNLOCKED FROM INSIDE



Write for Proposition to Contractors and Builders

HOLLAND CO., Holland, Mich.

offering every conceivable kind of machine, tool or mould necessary for successful results in all kinds of concrete work.

The Miracle line, consisting of concrete machines of single and double staggered air-space, two-piece wall block machines, brick machines, mixers, tile moulds, ornamental moulds and moulds for cornices, chimneys, piers, burial vaults, etc., is one of the oldest lines in existence—is well advertised and is thoroughly known to all contractors and concrete workers in the United States. It has a reputation for its many exclusive features and established quality.

The consolidation of these two giants of the concrete manufacturing business means a great deal to the trade and all interested in concrete construction. It enlarges the scope of the company to the extent of doubling their entire output, thereby greatly reducing manufacturing cost to contractors.

The Minneapolis plant will be abandoned and all machinery, stock, etc. will be moved to Eau Claire, where the manufacturing will be done in the immense plant of the Northwestern Steel & Iron Works. This last step was taken because of adequate facilities, added conveniences and more space afforded at the Eau Claire plant.

This merger represents the larges transaction in the history of concrete machinery and marks an epoch in the concrete machinery industry.

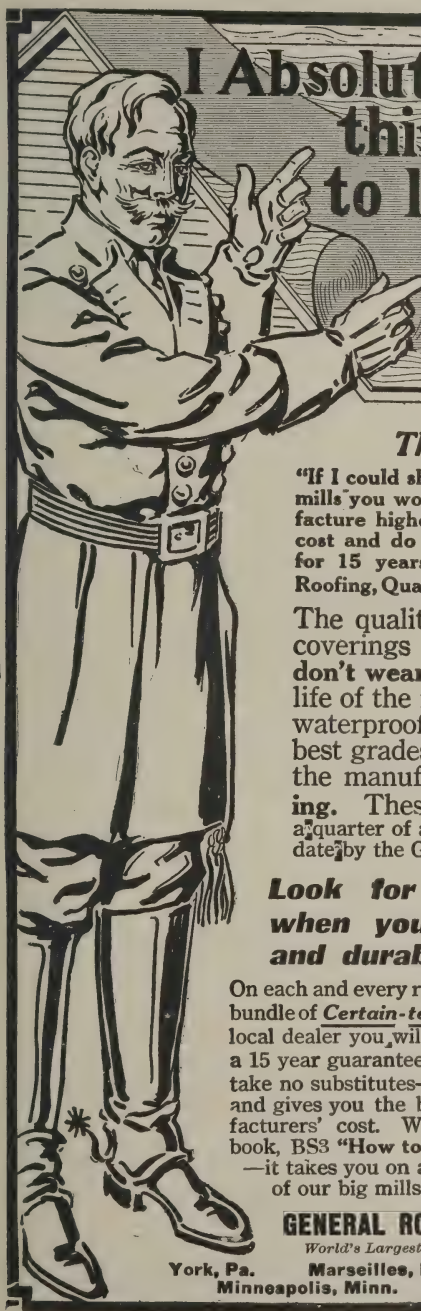
ORNAMENTAL IRON & BRONZE.

Catalogue "F" of the Dow Wire & Iron Works, Louisville, Ky., is a folio of photographs and sketches to demonstrate what they have done and are doing by way of suggestions to their clients for producing results that are both gratifying to themselves and a source of profitable advertising to the manufacturers. A large number of designs in grilles, wickets, office screens and partitions, vault railings, vent and register grilles, gates, balcony rails, stairs, signs, etc., are shown, all of patterns of high artistic merit, while many of these designs are more or less standard, the Dow Company have excellent facilities for special work in these lines.

We note that the Dow Wire & Iron Works have furnished the structural and ornamental work for a large number of modern buildings, many of which are illustrated in this catalogue.

The necessity for safety from fire in large school buildings has developed a style of spiral slide fire escape, which affords perfect protection. As it is used only in case of fire and cannot be used for any other purpose than rapid egress from the building, it is always in working order. The Dow Wire & Iron Works have been especially fortunate in the erection of their work and we would suggest that contractors having anything in their line get in touch with them, either with a view of purchasing their material or having goods erected in place.

I Absolutely Guarantee this roofing to last 15 years



The General Says:

"If I could show you through my three enormous mills you would then readily see why I can manufacture highest grade, durable Roofing at a low cost and do not hesitate to guarantee it to you for 15 years. That's why I call it *Certain-teed* Roofing, Quality Certified, Durability Guaranteed."

The quality of the asphalt used in roof coverings is important because **roofs don't wear out, they dry out.** The real life of the roofing is in the saturating and waterproofing compound used. Only the best grades of raw materials are used in the manufacture of ***Certain-teed* Roofing.** These are selected as the result of a quarter of a century's experience and kept up-to-date by the General's Board of Expert Chemists.

Look for the Certain-teed label when you buy Roofing—quality and durability guaranteed.

On each and every roll of ***Certain-teed* Rubber Roofing** or bundle of ***Certain-teed* Rubber Shingles** you buy from your local dealer you will find a ***Certain-teed*** label of quality—a 15 year guarantee. Insist on this ***Certain-teed*** label and take no substitutes—it is for *your protection,* and gives you the benefit of the low manufacturers' cost. Write today for our new book, BS3 **"How to Build for LESS Money"**—it takes you on a picture trip through one of our big mills—it's free for the asking.

Free

Book

GENERAL ROOFING MFG. CO.

World's Largest Roofing Manufacturers

York, Pa. Marseilles, Ill. East St. Louis, Ill.
Minneapolis, Minn. San Francisco, Cal.

Are You Going to Build?

Send 25c (and 10c postage) For Our $1.50 Book No. 3

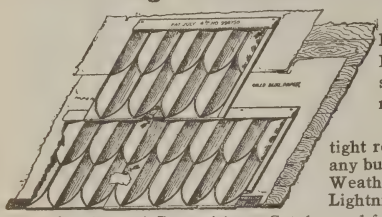
Originality, Personality, Individuality IN HOUSES BUILT FOR HOMES

Ranging from $1500 to $4000

Estimates given are correct and we stand back of them. And are itemized, therefore specially adaptable for Contractors' use.

PIERRE LINDHOUT, Architect
716-720 Ashton Bldg., Grand Rapids, Mich.

"Interlocking" Galvanized Iron Shingles

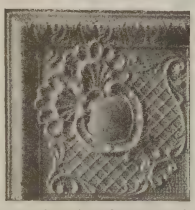


(Patented) Four Hook Locks—not slip joints—make an absolutely tight roof, protect any building from Weather, Fire and Lightning.

Write for Agents' Proposition. Catalog and full information on request. Write today.

The Metal Shingle Company 318 Jefferson Ave. W. Detroit, Mich.

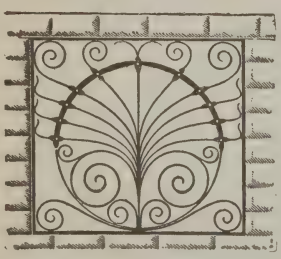
STEEL CEILINGS



Are you figuring on using a medium priced Steel Ceiling? Get our catalog by all means. It shows a line of beautiful ceilings of sufficient variety to please almost any individual liking, yet at prices surprisingly low.

The possession of this catalogue and a knowledge of our line and prices will save you many a dollar if you are an occasional or frequent buyer of Steel Ceilings.

Write for It Today
INDIANAPOLIS CORRUGATING CO.
Indianapolis, Indiana



Mr. Builder

If you are lucky enough to read this advertisement, and wise enough to write and tell us what you buy in

Iron, Brass and Bronze

we will send you catalog that is attractive enough to go in any man's library. Do you want it?

Dow Wire & Iron Works, Inc.
LOUISVILLE, KENTUCKY

BETTER BUILDINGS.

The American Sheet & Tin Plate Company, Frick building, Pittsburg, Pa., are offering to our readers their book, "Better Buildings," containing suggestions for the use of metal roofing and siding on various classes of buildings. Among the buildings shown are factories and mills, grain elevators, packing houses, warehouses, railroad sheds and boat houses, homes, churches, public buildings, bungalows, cottages and summer residences, garages, shelters, etc. Not the least interesting are carefully detailed drawings showing the construction of barns, wagon houses, implement sheds, corn-cribs, and poultry houses, as well as stores, pump houses, stock shelters, etc. One would hardly realize that so many uses could be found for products of this character as are shown in this book, which also contains rules and directions for measuring, and methods of application.

A great deal of useful information is given for builders and property owners on not only metal work, but on masonry, brick and concrete work, plastering, lumber, etc. While not a complete guide to modern building construction, it is about the first attempt to bring into one book so much valuable information on these classes of buildings. We are advised by The American Sheet & Tin Plate Company that our subscribers are welcome to a copy on application, and we would suggest that the application be made early as it will probably be necessary to issue several editions as soon as the value of this book is realized.

AN APPRECIATIVE CUSTOMER.

We are advised by the Missouri Water and Steam Supply Company, 931 South Sixth street, St. Joseph, Mo., that one of our subscribers writes them as follows:

"Michigan, April 29, 1912.

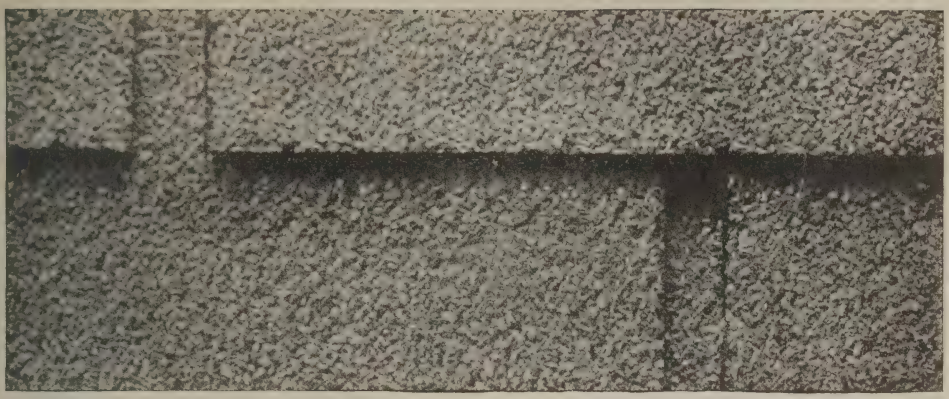
"Missouri Water and Steam Supply Co.,
"St. Joseph, Mo.

"Gentlemen: I found everything I ordered from you very satisfactory and just as represented, with considerable saving in cost. I do not hesitate to recommend you to others.

"Yours truly,
"C. R. TRUESDALL,
"Contractor and Builder."

Letters like this are a source of great pleasure to our advertisers, and we are gratified to have been the medium through which this satisfactory sale was consummated.

From our investigation of the Missouri Water and Steam Supply Company before accepting their advertising, we believed their goods were as represented, and that they would carry out their part of the bargain. Their large stock of plumbing, water and steam supplies, windmills, tanks, etc., enables them to fill orders promptly, and their shipping facilities are unusually good. Our readers who are not familiar with their catalogues should send for them at once that they may participate in the saving as our other subscriber did.



IF we offered you a ten dollar gold piece you'd be foolish not to take it—don't you think?

All right—Here's dollars unlimited for the first man in your community who gets acquainted with—and pushes

FLEX-A-TILE ASPHALT SHINGLES

It is the most remarkable roofing material you've ever seen—Makes a beautiful, brilliant, tile-like surface—easier to lay than wood shingles—several times as durable—and remarkably inexpensive.

IT'S A WINNING PROPOSITION
FOR ANY CARPENTER OR BUILDER.

FLEX-A-TILE Asphalt Shingles have a chipped slate or granite surface, and this slate or granite is rolled into the asphalt under heavy pressure until it becomes an actual part of it. The natural colors of the slate and granite give the coloring to the shingles. Shades are deep red, greenish gray, silver gray, and brown. They are natural. Can't wear off or fade.

FLEX-A-TILE COMES IN ROLLS
AS WELL AS IN SHINGLE FORM

Write today for free sample. Be the first in your community to use this beautiful new roofing.

THE HEPPES COMPANY

1012 Forty-Fifth Street **Chicago, Illinois**

THE P. S. & W. RAFTER-FRAMING SQUARE.

A new rafter square has been recently placed upon the market by the Peck, Stow & Wilcox Company of New York and Cleveland.

This square presents an entirely new feature in the method by which the rafter framing tables are displayed on the face of its body.

The inch spaces on the face of the square are distinguished from each other by vertical lines extending from the number on the outer margin, clear across the square, thus forming a series of boxed-in rectangular spaces.

At the left-hand side of each of these spaces and almost equally distant from the outer and inner margins of the square is situated a conspicuous numeral corresponding to the number on the inch-scale above.

The right-hand portions of the rectangular spaces previously referred to are occupied in each case by a column of figures.

The large numeral indicates the rise per foot run of a roof; the column of figures at the right of it contains the information for finding the length of a common rafter per foot run of roof; the length of hip or valley rafter; the length of jack-rafters spaced sixteen or twenty-four inches; the side-cuts for hip, vallay of jack-rafters; the cuts for sheathing or shingles in the valley or on the hip.

The peculiar advantage claimed for this square consists in the fact that each column of figures giving the necessary information is enclosed with the numeral standing for the rise of roof wholly within two parallel lines at right angles to the body of the square.

Thus the mechanic can never be in doubt as to which column of figures corresponds to the number indicating the rise per foot run.

This arrangement does away entirely with the confusion arising from the ordinary system of marking, where the inch scale on the outer margin of the square is also used to indicate the rise per foot run. When the numbers of this inch scale consist of two figures they are bisected by the line at right angles to the square indicating the inch mark. When they consist of one figure they are set to the right of the inch mark. Thus they do not always appear in the same relation to the column of figures giving the information.

Another source of confusion is the fact that the numbering of the inch scale on the outer margin of the square does not correspond exactly in position with the numbering on the inner margin.

The addition of a row of conspicuous numerals down the center of the body of the square removes entirely any such source of confusion in using the Peck, Stow & Wilcox Rafter-Framing Square.

The square has a 24x2 inch body and 16x1½ inch tongue and is made in a variety of markings and finishes. Of the six styles, three—numbered R-100, R-1, and SR-100 respectively—show the full set of measures; rafter, brace, Essex board, and eight-square. The SR-100 is also a take-down, being one of the regular members of the P. S. & W. Co.'s well-known "Samson" Take-down Square.

BORING MACHINE TOOLS.

Many contractors find that there are numerous times in getting out millwork, trim, etc., for a building where power boring machines can be used. In fact, one of the handiest and most useful parts of the so-called combination saw rigs is the boring attachment. With this arrangement it is possible to bore not only one hole at a time, but it is sometimes advisable

Quadruple Bit for Boring Pulley Stiles.

to bore several at once. One such condition is in cutting the hole for sash pulleys.

The Grand Rapids Hardware Co., among other specialties, manufacture a tool especially for cutting mortises for sash pulleys. One of these tools, consisting of a quadruple bit, was designed to bore at one operation the opening required to fit their sash pulleys. The cut shown indicates fully the operation of this tool, it being only necessary to attach it to the shaft of the borer.

The Grand Rapids Hardware Co., 118 Pearl St., Grand Rapids, Mich., will be glad to send particulars regarding this and their other hardware specialties to any contractor or builder having use for the better quality of tools, hardware and fixtures.

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HERE is the argument that sells Amatite to the consumer: Imagine yourself using it and see how effective it is—

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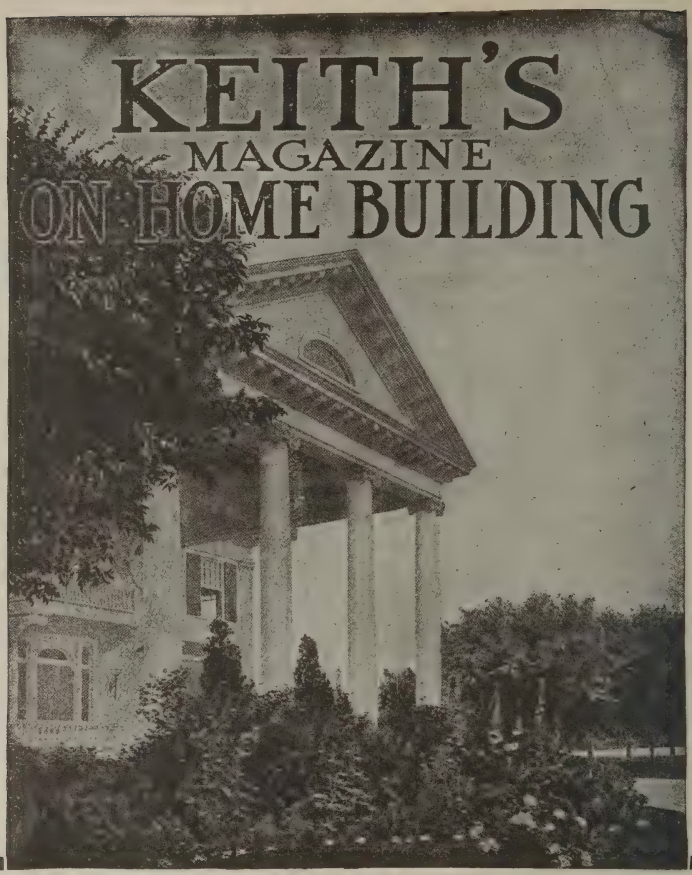

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The Bell Wether Contractor

By JACK DAHLTON

In every line of business in every place in the world, there are certain men who become the Bell Wethers of the bunch. These men do not simply grow up. They get to be Bell Wethers because they have denied themselves a lot of things that they thought they would like. While the other fellow was having his fun, the coming leader was right on the job every minute.

The Bell Wether Contractor knows that the journeyman who is content with a cheap rusty saw, a slivery handled hammer and an old square, is just holding his job "Until Something Better Comes Along." "Something Better" never comes along for the man who won't make good on the job he already holds.

The Bell Wether Contractor has always been a big influence in the building field, but he is going to be even a bigger man than ever before.. He knows what it means when the prospective home builder calls him over and whispers, "Say Bill, I have a nice house plan I want you to go over with me tonight.. Don't say anything about it. Keep it quiet until I am sure of what I want." This contractor knows he is the first man in town to be consulted. He is the one who advises the owner to put in a furnace instead of hot water or vice-versa. He is the one who tells the home owner how he can have the finest hardwood finish in his home instead of that soft wood the plan shows. He tells him how he can do it without materially increasing the price. He shows the prospective property owner dozens of catalogues which he has secured from the advertisers in his business paper—THE NATIONAL BUILDER. He shows him samples of the materials. He changes the size of the kitchen, making it smaller, and increases the size of the living room.

The Bell Wether Contractor Knows that he is really the architect on the job. He therefore realizes that he must be just as careful as the prominent architect of what he recommends or specifies. He knows that if he gets that job, every one in town will have his number if it isn't right.

The Bell Wether Contractor is as particular of his reputation as the manufacturer is of his trade mark on tools, machinery, building materials, etc. He knows that a man who will write an anonymous letter is often justified in doing so, but he does not want to buy from unknown building material companies or manufacturers. He knows that he is specifying and buying thousands of dollars worth of materials every year. If a material is good, he is glad to stick to it, and insists upon getting it year after year for his different jobs. But if the material is not right, he does not want to risk his reputation on it again. He knows that the advertisers in THE NATIONAL BUILDER are not ashamed of making and keeping his acquaintance. No advertiser who has achieved a good reputation among THE NATIONAL BUILDER readers wants to lose it, any more than he wants to have every one in town point to a failure he has made.

The Bell Wether Contractor knows that it is the advertising in THE NATIONAL BUILDER which will keep him posted on what is being specified and used in the building field. They are there to help him. They will send their catalogues and samples to Bell Wether Contractors and also those who have "the makings" in them to become Bell Wether Contractors for their towns.

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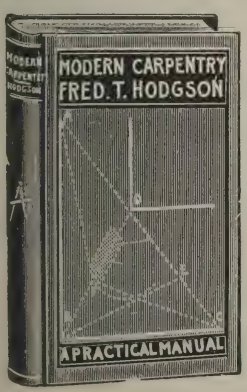

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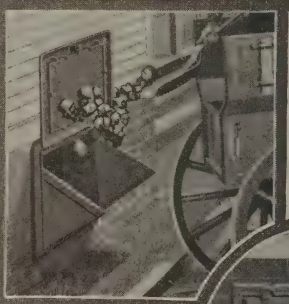

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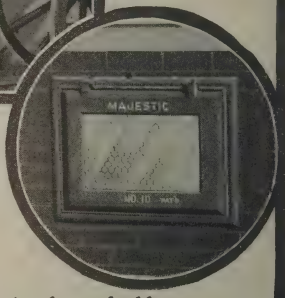

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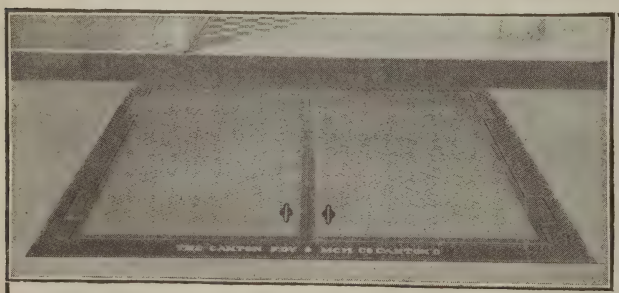

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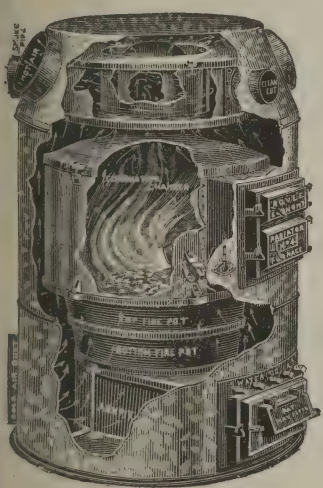

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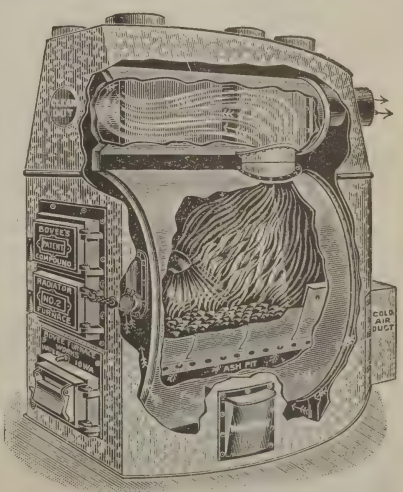

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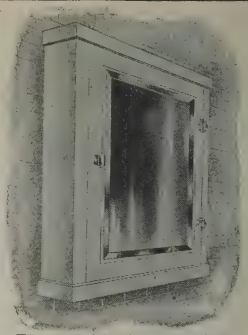

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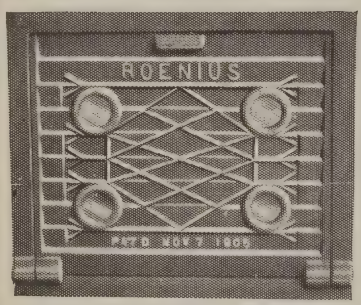

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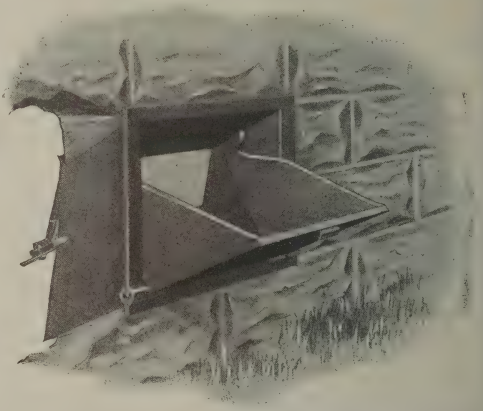

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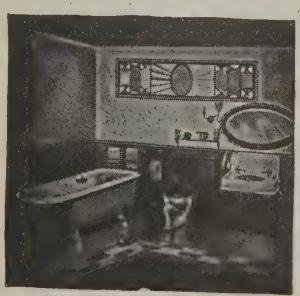

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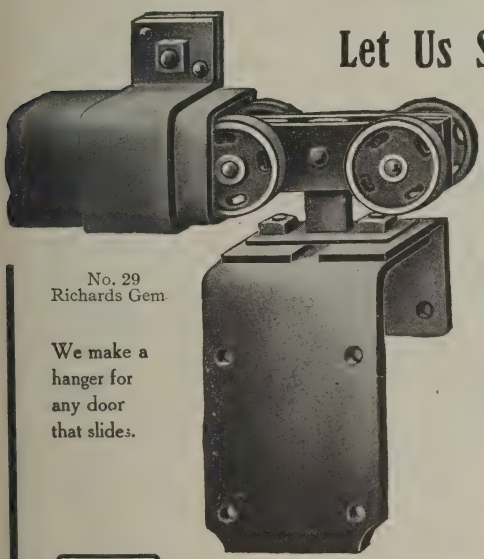

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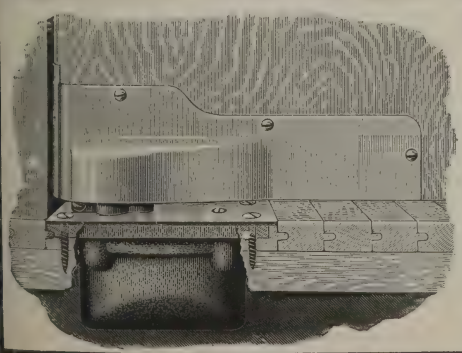

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$5,000 to your family if your **ACCIDENT** results fatally.

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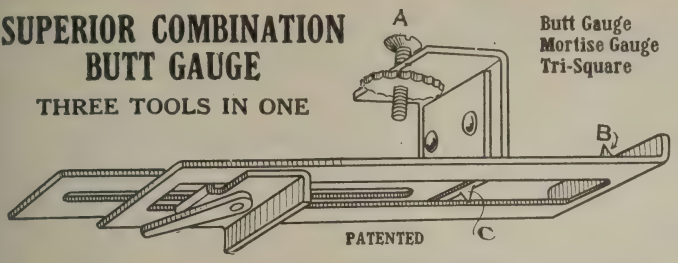

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COMPLETE FOR A

4 Room House . . $25.95
5 Room House . . $27.95
6 Room House . . $29.95
7 Room House . . $31.95

$4.70 is our price for this beautiful 4-lt. electric shower wired complete with glassware as shown ready to install. You would think nothing of paying $9.00 for the same shower.

Each fixture is of best quality of brass finish and beautifully designed. On account of the unusually close figure on these outfits, $1.50 is charged for boxing.

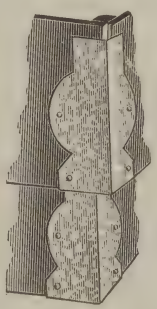
CONTRACTORS AND BUILDERS

write us before ordering gas or electric fixtures—we can save you money and please your customers. Let us mail you some of our free blue prints showing many beautiful designs in fixtures—Art Domes and Showers. Drop us a line now.

CHICAGO GAS APPLIANCE CO.

30-32 W. Lake Street CHICAGO, ILLINOIS

More Profit For You.



You can now give your customer the popular mitre-corner effect without the slow, careful work of cutting and fitting bevels.

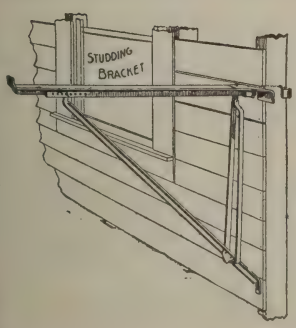
Use Metal Building Corners

They take the place of corner boards. Save fully $2 worth of time in finishing each corner, make a stronger and neater job.

WRITE FOR FREE SAMPES TODAY.

F. D. KEES MFG. CO. BEATRICE, NEB Box 811

If you've never used Gossett Hinges for full length window screens, say so and we'll send you a sample pair free.



THE "DETROIT" FOLDING SCAFFOLD BRACKET

COMBINES ALL GOOD FEATURES

SAFE: Owing to its peculiar construction, the load strain is entirely Downward with no tendency to pull outward from the building.

CONVENIENT: Its automatic and positive grip makes it possible to set up in 15 minutes without bolts, screws or nails.

ECONOMICAL: No builder can afford to be without it because its cost can be saved on a single contract.

MADE FOR EITHER STUDDING OR SHEATHING

FOLDING SCAFFOLD BRACKET CO.

50 Fort Street W. **Detroit, Mich.**

Women and Children First!

THIS IS THE RULE OF THE SEA. So that on the Titanic, with courageous self-sacrifice, the men stood aside while the women and children filled the life boats and were pulled away from the sinking ship.

On this ship were many men who had insured their lives in the TRAVELERS, against just such disasters, for more than a millon dollars. This is a great sum for any insurance company to have at risk in one disaster, but the TRAVELERS will meet it promptly, taking pride in the fact that in protecting the widows and orphans of such men it is doing the work it was put in the world to do.

In times of sudden disaster men rise to these supreme demands of life. But may we not call attention at this time to those everyday acts of self-sacrifice by which many of these men who went down, built up the legacies which now belong to those they have left behind. May we not think that after seeing the women and children safe, the minds of some of these men dwelt with satisfaction upon the help that would come to their families from their policies? And may we not think that the little hardships of meeting premium payments helped to build the kind of character which was able to meet this supreme test of courage?

The TRAVELERS INSURANCE COMPANY as the pioneer accident insurance company of America, speaks at this time about the value of accident and life insurance with no feeling of impropriety. It believes that it is doing a good work in lessening the hardships which follow in the wake of any disaster, great or small and in paying losses unparalleled in the history of accident insurance, the TRAVELERS feels that it is its duty to remind men everywhere, that at all times it is "Women and Children First," and that men respond to that call when heeding the familiar

MORAL: Insure in the TRAVELERS

Travelers Insurance Company, Hartford, Conn.

Assets, $79,900,000. Liabilities, $67,900,000. Surplus, $12,000,000.

The Travelers Insurance Company, Hartford, Conn. Tear off

Send me particulars about Travelers Insurance. My name, business address, age and occupation are written below.

FRONT ELEVATION.

This Is the Bar for that New Store Front

It's mighty important for you to choose **Petz Bars** for that new store front. By remembering that word, and insisting on **Petz Bars,** you are assured of handsome appearance, long life, and perfect ventilation for your store front, and perfect safety to your glass.

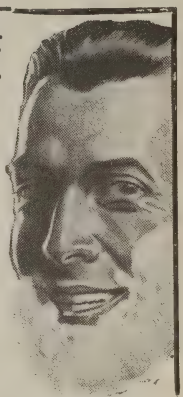
EASY TO INSTALL

Our booklet, "Metal Store Front Construction," tells the whole story, and illustrates the different types of bars that we make. We will send you a copy promptly on request.

Detroit Show Case Co., Sole Makers
481 Fort Street West, DETROIT, MICH.

Real Safety Razors —not scraping acquaintances

You "take to" the KEEN KUTTER Razor at once. You do not have to get the "hang" of it, because it is made with a "hang" that fits into the natural shaving motion. Instead of a blade at right angles to the handle, the KEEN KUTTER blade is set at an acute angle almost parallel with the handle. The result is that a firm control is obtained over the razor and the shaver slices off the beard with sure, clean strokes.



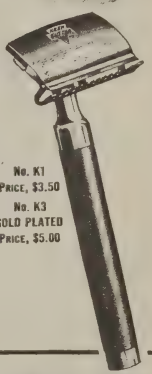
KEEN KUTTER
Safety Razors

KEEN KUTTER blades are made thick enough to hold their own against the stiffest beard. Made of the finest Swedish steel.

The KEEN KUTTER Junior, shown on the left, is a wonderful safety razor value at $1.00, which includes case, razor and 7 blades.

No. KJ10
KEEN KUTTER
JUNIOR
PRICE, $1.00

The KEEN KUTTER regular safety razor is slightly longer and a trifle different in pattern, with silver plated frame, and genuine black leather case, with twelve blades.

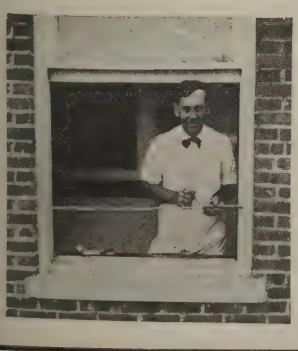


No. K1
PRICE, $3.50
No. K3
GOLD PLATED
PRICE, $5.00

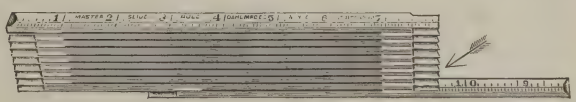
"The Recollection of Quality Remains Long After the Price is Forgotten." Trade Mark Registered. —E. C. SIMMONS.

If not at your dealers, write us.

SIMMONS HARDWARE COMPANY, Inc.
St. Louis and New York, U. S. A.



The Master Slide Rule



is the only Rule in the World whereby inside measurements of doors and windows. etc., can be taken rapidly and accurately. It is also far superior to any other rule for outside measurements of walls and ceilings, etc., as it can be extended and closed instantly. **Mechanics, Builders, and Architects, try one today! Don't wait!**

On receipt of 15 cents per lineal foot, a 4, 5, or 6 foot rule will be sent to you prepaid.

Large profits to agents. Write for circulars and particulars.

Dahl Manufacturing Company, A 1 East 42nd Street **New York City**

An Automatic Boring Tool that Fits Your Pocket

This is a mighty handy, convenient tool. It is compact and when compressed can be carried in the pocket. But set it to work and you'll find it has all the good qualities of larger and more expensive borers.

STAR BORER No. 8

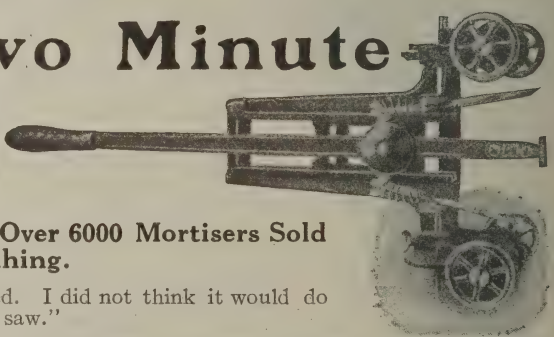
has cells in the handle holding eight drill points ranging in size from $\frac{1}{16}$ inch to $\frac{11}{64}$ inch, and numbered from 1 to 8. Cell No. 9 contains a small screwdriver to be used when the tool is compressed, with the plunger forced back into the handle and held there.

The price of this Auto Pocket Borer is ***$2.00.*** Look for the name—***MILLERS FALLS.***

Our book "Tool Practice" is FREE—Send for it

MILLERS FALLS COMPANY
28 Warren Street, NEW YORK CITY

Miller's Two Minute
Lever Lock
MORTISER



Actual Use of Tool ½ Minute

Chisels the opening for Locks. Over 6000 Mortisers Sold Means Something.

One builder wrote us: "I was surprised. I did not think it would do the work so quick. This is the best I ever saw."

THINK THIS OVER, MR. CONTRACTOR AND BUILDER

Our patent double edge, side cutting chisel can cut more wood, four times more rapidly and 100% less exertion than any boring bit. Mortise to be of the same size.

MILLER'S TWO MINUTE LOCK MORTISERS

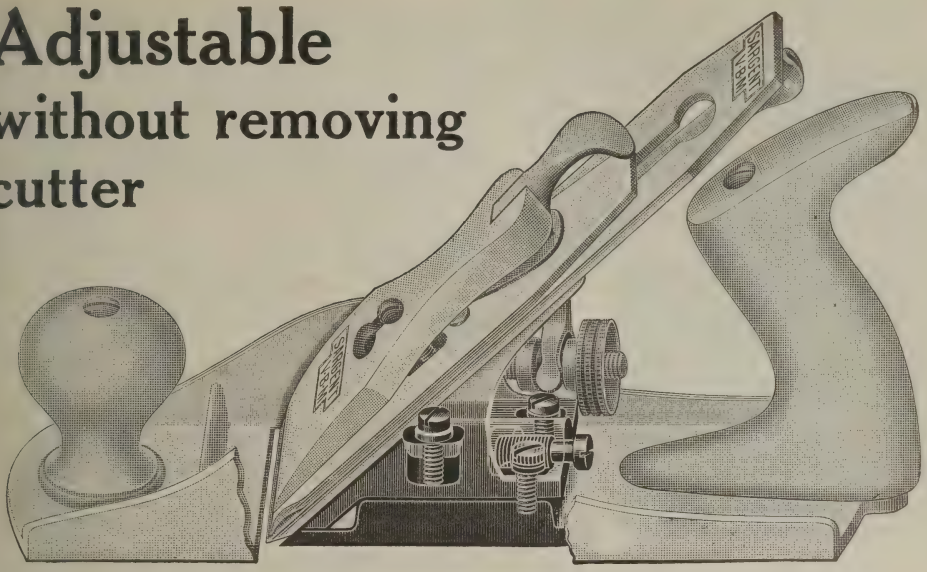
Guaranteed to be as we represent, and will send on trial to any reliable contractor and builder. We will return all money paid if it does not cut an opening in a door for a mortise lock in three minutes.

We also make a Butt Mortiser and Rule Gauge which cuts out the seats for butt hinges in soft or hard doors, jambs, and similar work, which we will send you postpaid for ***75 cents.***

A. W. MILLER MFG. CO.

Main Office and Factory, - - - RIVERSIDE, CALIFORNIA
Eastern Office and Shops, CINCINNATI, OHIO

Adjustable without removing cutter



SARGENT PLANES

FROG ADJUSTMENT

FINE WORK requires a very narrow opening between the front of the mouth and the cutting edge of the cutter. *Coarse work* requires support close to the cutting edge of the cutter to prevent chattering. By this improved construction, *the frog with the cutter still clamped in position* on it may be *adjusted* forward *for fine work* or backward for *coarse work* and at all times it is so supported as to prevent chattering. The Frog is moved forward or backward on a line parallel with the base so that no adjustment of the Cutter is required after the frog adjustment has been made.

The Clamp and Cutter may be left fastened to the Frog while the adjustment is being made.

SOLID—RIGID—FIRM

These Planes have the double seat, giving two points of contact of the bottom of the Frog with the Bed or Bottom of Plane. At these points both the Frog and the Bed are profiled or milled, insuring accuracy of fit and a solid firm seating of the frog on the Bed.

CUTTERS

The Cutter is made from improved Sheffield Steel tempered and drawn by an improved process and tested for proper temper by a hardened tool, then polished and sharpened ready for use and is *warranted.*

KNOBS AND HANDLES

The Knob and Handle are made of East India Mahogany, very durable, of rich dark red color which makes them very attractive in appearance. The handle is shaped to fit the hand of the user and for this purpose has a wide curve where the palm of the hand naturally rests.

WARRANTED

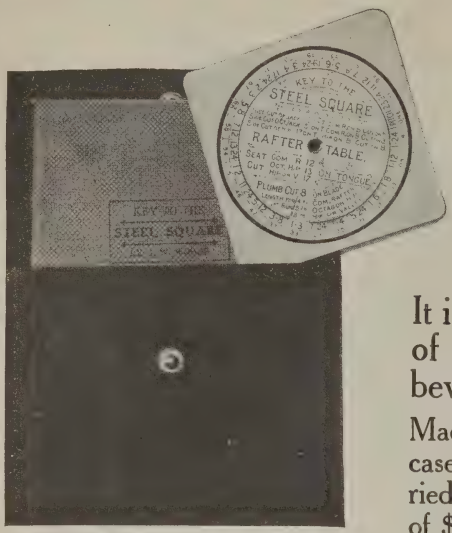
Every Plane is tested before leaving the factory and each part of every Plane is also put through a rigid test so that weak construction is almost certainly avoided and an absolute guarantee is therefore made by the makers, not only on the plane as a whole but on each individual part.

Made with both Smooth and Corrugated Bottoms in the following sizes:

Smooth, 7, 8, 9, and 10 inch; Jack, 14 and 15 inch; Fore, 18 inch and Jointer, 22 and 24 inch.

THE SARGENT TOOL BOOK—Free on request—gives a description of the full line of Sargent Planes and other tools. Send for your copy.

Sargent & Company 1151 Leonard Street NEW YORK



Wood's Key
TO THE
Steel Square

Has been tried by thousands of Builders and not found wanting. It is a wonderful instructor as to the uses of the square in obtaining cuts and bevels for all kinds of work.

Made of celluloid and put up in neat leather case of pocket size so that it can readily be carried on the job. It is a snap at our low price of $1.50.

Send your order at once and it will be shipped prepaid to your address

Hodgson Book Co.

537 South Dearborn Street **CHICAGO**

Reinforced Concrete

A Manual of Practice. — By Ernest McCullough, M. West. Soc. Engrs. Cloth, 5x7¾ inches. 136 pages, illustrated. Price, postpaid.....$1.50

This book presents the theory of the design of reinforced concrete structures in a manner so clear and simple that it cannot fail to be popular. The subject is divested of the complications so often found in larger treatises, for the author has exceptional skill in simplifying that which seems complex.

As an experienced designer and builder of reinforced concrete structures, the author discusses not only the design but goes into the practical details of construction. The book is so condensed, and so much of its matter is original, that it is well worth its price to every concrete engineer or contractor.

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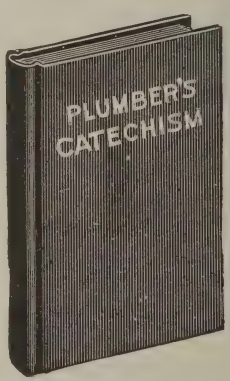
Get our Complete List of Books for Contractors and Builders

Plumbing-Catechism



Price, $1.00 delivered

Theory and Practice of Plumbing Design. By Charles B. Ball, M. Am., Soc. C. E., and M. Am. Soc. Inspectors of Plumbing and Sanitary Engineers, and Herbert T. Sherriff, A. B., some-time editor of "Domestic Engineering," M. Am. Soc. Inspectors of Plumbing and Sanitary Engineers. Bound in cloth; 6¾x4¾ in., 100 pages; elaborately indexed.

This book formulates, in question and answer form, the basic principles of plumbing design and practice, crystalizing the knowledge of the skilled plumber, and providing the non-technical reader a source of information as free as possible from puzzling set phrases. It does not discuss matters of handicraft such as joint wiping, lead burning, etc.

Contents—Plumbing Fixtures; Lavatories, Kitchen Sinks, Bath Tubs, etc. Water Service Pipes. The Design of Pipe Systems, Pumps, Effects of Freezing, etc., etc.

Hodgson Book Co.

539 S. Dearborn St., **Chicago**

ARCH GRILLE AND COLONNADE OF HIGHEST QUALITY

WILL GREATLY INCREASE THE RENTING OR SELLING VALUE OF ANY HOUSE

$18.00 and up

A very low Price for this Stylish New Design in a Colonnade Arch Grille

Colonnade Grille No. 604

NET PRICES

Any height not exceeding 9 ft.

Width of opening	
Not to exceed 6 ft.	$18.00
" " " 7 ft.	19.00
" " " 8 ft.	20.00
" " " 9 ft.	22.00
" " " 10 ft.	25.00

This Attractive Design

is one of the latest additions to our extensive line. It was selected because of its tasty appearance, its excellent quality and because the price is reasonable.

The Best Colonnade Arch Grille in the Market for the Price Asked $18.00

This Colonnade Grille

Is a plain design of very massive, yet elegant proportions. The columns are 5 inches in diameter, tapering to receive fancy composition cap. The pedestals are 30 inches high and 24 inches wide. The panels in pedestals are raised, set in perfect mitered moulding. The baseboard on pedestals is mitered around box post.

The beam between Grille and Composition Cap is 4 inches high, set with embossed moulding and mitered on face. We call particular attention to the mitered parts as explained, as this is the most complete finishing on a colonnade arch grille.

Rests for Jardinieres included, everything complete as shown in illustration.

For openings 8 feet wide or less the pedestals and columns will be made in proportion to opening.

Made of Oak Yel. Pine, or Birch, in the white, ready for finishing.

SEND YOUR ORDER NOW WHILE THIS IS BEFORE YOU. WE GUARANTEE SATISFACTION, QUALITY AND SAFE DELIVERY.

IF YOU HAVE NOT A COPY OF OUR CATALOG BE SURE AND WRITE FOR IT.

This Massive and Handsome Colonnade

Simple, but Elegant in Design and Architecturally Correct

Best in the Market for a Low Price Colonnade. Read Description Carefully

$12.25 and up

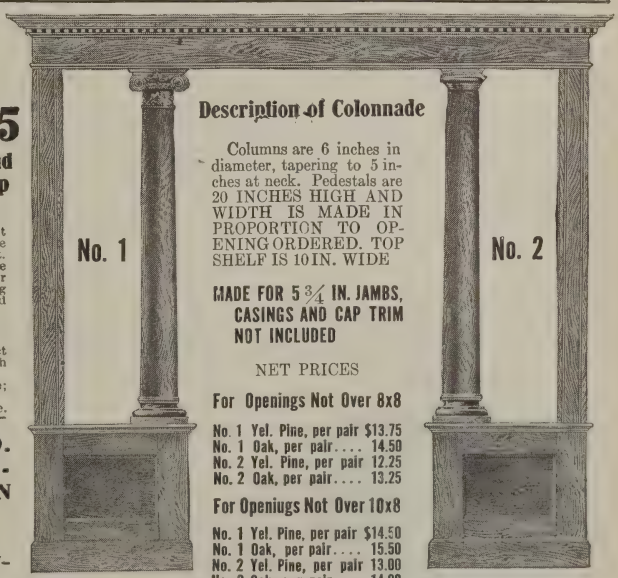
Illustration of Colonnade on this page shows one of the best colonnades ever offered for the price asked. The design is of massive appearance and the lines throughout are architecturally correct. This design is gotten out by one of the best Grille and Colonnade designers in the country, every part is figured to give the proper proportions so when the Colonnade is set up in place, it is very pleasing to the eye. A high class piece of work and a design that will add considerable to the beauty and cheerfulness of a home.

Instructions for Ordering

Give exact width of opening from jamb to jamb. Give exact height from floor to where top of cap will rest. Always give the width first then the height.

State what kind of wood is wanted, either Oak or Yellow Pine; also be particular and give design number.

Send order early. Do not wait until all other trim is set up in place.



Description of Colonnade

Columns are 6 inches in diameter, tapering to 5 inches at neck. Pedestals are 20 INCHES HIGH AND WIDTH IS MADE IN PROPORTION TO OPENING ORDERED. TOP SHELF IS 10 IN. WIDE

MADE FOR 5 3/4 IN. JAMBS, CASINGS AND CAP TRIM NOT INCLUDED

NET PRICES

For Openings Not Over 8x8

No. 1 Yel. Pine, per pair	$13.75
No. 1 Oak, per pair	14.50
No. 2 Yel. Pine, per pair	12.25
No. 2 Oak, per pair	13.25

For Openiugs Not Over 10x8

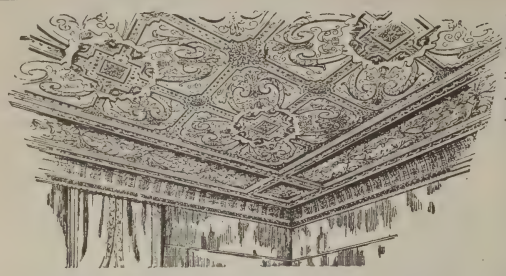
No. 1 Yel. Pine, per pair	$14.50
No. 1 Oak, per pair	15.50
No. 2 Yel. Pine, per pair	13.00
No. 2 Oak, per pair	14.00

WRITE FOR OUR CATALOGUE NO. 35. IT SHOWS THE MOST MODERN AND UP-TO-DATE LINE IN THE MARKET.

OVER FIFTEEN YEARS IN BUSINESS MANUFACTURING HIGH QUALITY GOODS.

BERTELSEN ADJUSTABLE GRILLE CO.

619-621 South Clinton St.
CHICAGO, U. S. A.



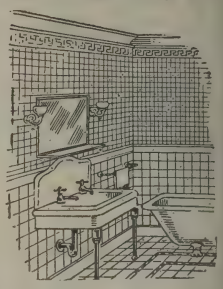
METAL TILING

For the Kitchen and Bathroom
Carpenters Can Apply It

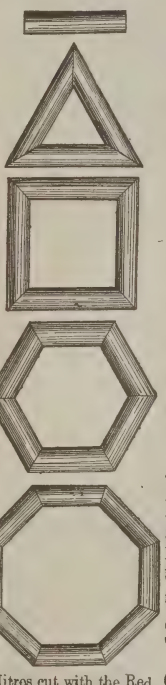
METAL CEILING

Something exceptional—out of the ordinary class—and as plain or elaborate as you like.

Patterns especially adapted for residence work. Nothing better for a new house, or to repair an old one. Catalog.



NORTHROP, COBURN & DODGE CO.
30 Cherry Street, NEW YORK



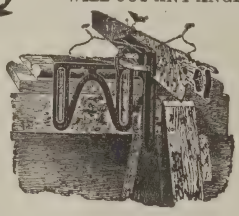
The Improved Red Devil Mitre Box

(Improved Feb. 1912)

What it will do with ANY Saw ANY Place.

SEE THESE MITRES? All absolutely perfect—cuts and accurate joints.

THE RED DEVIL MITRE BOX WILL CUT ANY ANGLE



It's all metal. It weighs 2 lbs.

There is no other just as good and you can easily prove it by accepting our

SPECIAL OFFER—On return of this "Ad" and $2.00 one of these Mitre Boxes will be shipped to any reader of "The National Builder." Offer good for 30 days from date of issue.

Smith & Hemenway Co.
Manufacturers
Chambers St., New York, U. S. A.
Red Devil Tools are the Best on Earth

Mitres cut with the Red Devil by an amateur

Milk's Pocket

Miter Box

Of Aluminum

Cannot break *Guaranteed accurate*
Requires no bench

Always with you, in the pocket. Make cut while holding moulding. No extra saw to pay for, use any fine saw you have. Ask your dealer, if you cannot get it, send $1.00 for it on one week's trial.

Satisfaction or your money back

The Parsons Tool Mfg. Co.

2030 Corning
PARSONS : KANSAS : U. S. A.

THE SIMPLEX IMPROVED MIXER

1912 MODEL

Three Hoppers, continuous feed, rolling mix, low down steel frame, simple, strong and accurate

"THE MILES"

No. 5, DOWN FACE WET CONCRETE BLOCK MACHINE

Makes Stone in Lengths 4, 6, 8, 10, 12, 16, 18, 20, 22, 24 inches. In Widths 4, 6, 8, 10, 12 inches. In Height 4, 6, 8 inches.

Also Angle Stone, Circle Stone, Gable Stone, Hollow or Solid Stone. Simple, Strong and Rapid. Lowest in price. WRITE FOR NEW 1912 CATALOGUE.

THE MILES MFG. CO., Inc,
303 E. Franklin Street. Jackson, Mich.

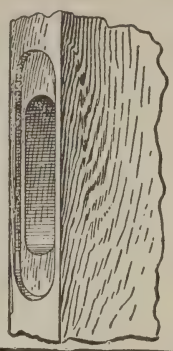
The Contractor's Friend

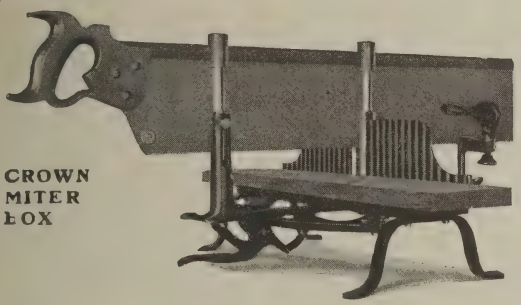
Universal Lock Mortiser

No builder should be without one.

Will cut lock mortises, **including setting in of face plate,** of any desired size, in hard, soft or crossgrained wood in from 3 to 6 minutes. No boring required. Every machine guaranteed. Makes a perfect job. Easily operated. Testimonials and descriptive booklets furnished on application to

UNIVERSAL LOCK MORTISER CO.
Geo. O. Rogers, Sales Manager
3404 Alliquippa St. Pittsburgh, Pa.


Showing lock mortise cut, including face plate setting


CROWN MITER BOX

BUY DIRECT FROM THE MANUFACTURER

SAVE THE MIDDLE MAN'S PROFIT

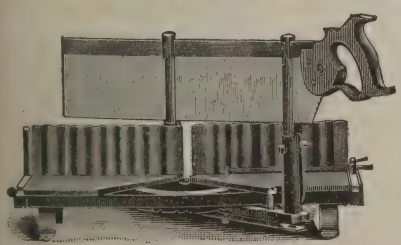
IT has a high and a low stop, saw can be raised 1½ inches above bed by release lever. **YOU CAN OPERATE THE RELEASE LEVER** while holding the handle of the swinging bar. This enables the operator to use one hand to hold stock and at the same time swing saw to any desired angle. The high stop holds saw 5¼ inches above bed while placing stock for cutting.

It has a positive center and octagon stop, also a graduated brass circle, and any degree can be obtained very easily.

FORMERY SOLD FOR $12.50, NOW SOLD FOR $8.95
WRITE FOR OUR EASY PAYMENT PLAN WHEREBY EVERY CARPENTER CAN OWN A MITER BOX.

CROWN TOOL MFG. CO., OTTUMWA, IOWA

GOODELL MITRE BOX



MADE OF STEEL——CANNOT BREAK

First in Quality and Improvements

Automatic stops for holding up saw. Corrugated Backs. Graduated. Gauge for duplicate cuts and many other features. If you want the best you will take no other.

SEND FOR CIRCULAR E

GOODELL MFG. CO. GREENFIELD, MASS.

Send for our catalog No. 19 M and see what other time savers we make.

Our builders' combination tool will look pretty good to you,

Starrett Patent Stair Gage

Stair Work Made Easy by its use. Just clamp it on to your steel square and you can accurately and rapidly lay out stair stringers, rafters, braces, etc.

42-31

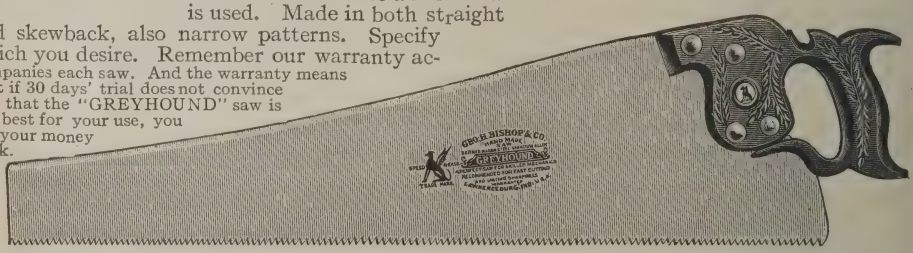
The L. S. Starrett Co.
Athol, Mass.

New York 153 Chambers St. | Chicago 11 No. Jefferson St. | London 36-37 Upper Thames St., E. C.

Greyhound Hand Saws

The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. ***This saw will be imitated by others—but not equalled.***

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the best for your use, you get your money back.



Inches,	18	20	22	24	26	28	30	Net.	Packed one in a Box
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		

Order one today and let us take all the risk. If you want literature first, write us

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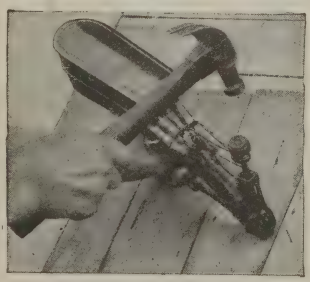
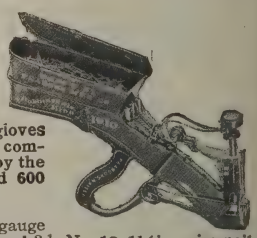


Pays For Itself on One Fair-sized Shingling Job



Works well on roofs of any pitch. You can wear gloves or mittens and drive nails faster and with more comfort than the old way. Just throw the nails in by the handful (Nailer holds easily between 500 and 600 nails in the top), and start nailing.

PEARSON NAILERS are made in two sizes.

The Blue Nailer is for common 3d, No. 14 gauge wire nails, and the Red Nailer is for the **galvanized** 3d, No. 13, 1¼ in. wire nails. Order from your dealer or send **$5.00** for either one—express prepaid. Money cheerfully refunded if Nailer is not as represented. *Write for Circular "N"*

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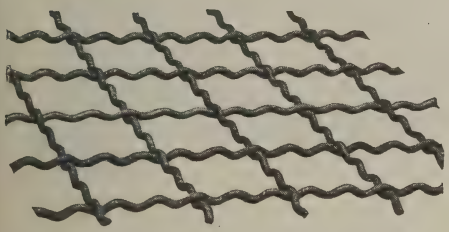
Scheeler's Sons
Manufacturers of

WIRE CLOTH

Crimped Wire Concrete Reinforcement, Plain and Galvanized, in all size meshes and Gauges of Wire.



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Clinton Electric Welded Fabric

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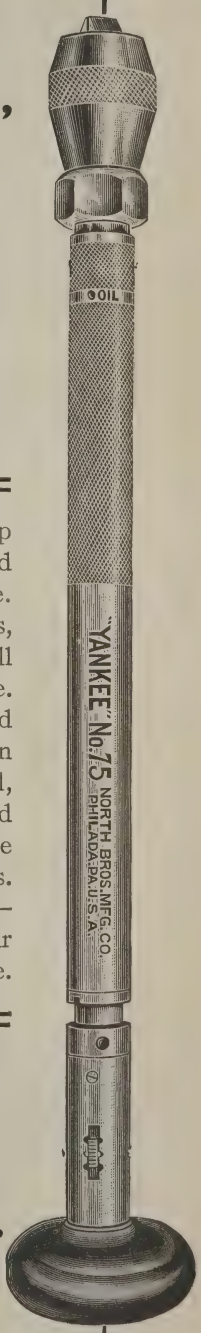
Drives Wood Augers up to ⅜-in. easier and quicker than a Bit Brace. Drives or draws screws, and takes all the small tools used in a bit brace. A fine tool for crowded corners. Bearing down on handle drives the tool, giving it the quick and easy motion of the "Yankee" Spiral Drivers. Built for good service—it's a "Yankee." Let your dealer show you one.



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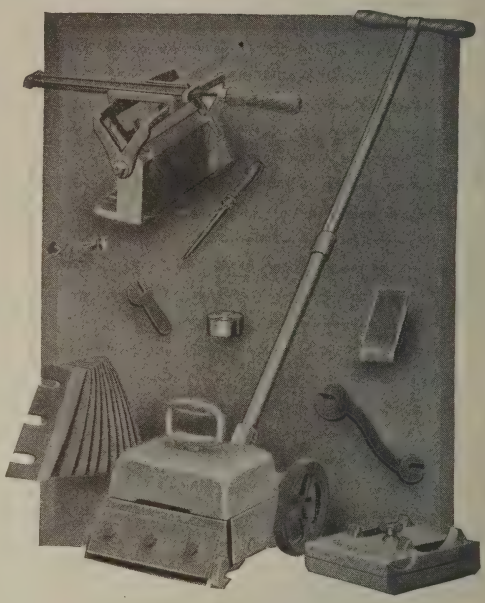
EVERY SHAVING MEANS A SAVING

of 75% when the

Acme Floor Scraping Outfit



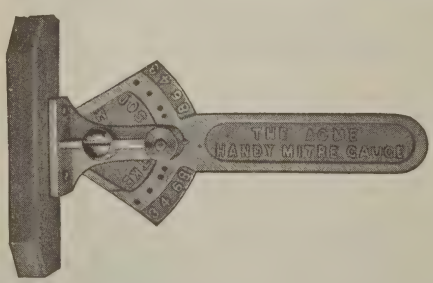
is on the job—because one man with this outfit can do the work of four men using hand scrapers and do it better.

Thousands of contractors have proven this on their own work. Are you willing to be convinced? If you are, let us send the Acme Floor Scraping Outfit to you on one week's free trial, and after you have worked with it and then are not entirely satisfied, just send it back to me at my expense.

No strings to this offer whatever. Just a straight business proposition based on the principle of permitting you to try before you buy. If your dealer does not carry my outfit, then write me for booklet and further particulars.

The Acme Handy Mitre Gauge

is one of those little tools that is a great time saver. It fits in the pocket where it is always ready for immediate use. The dollar that you pay for this mitre gauge is the best investment that you ever made. If your dealer can't supply you, I can. Guaranteed absolutely accurate.



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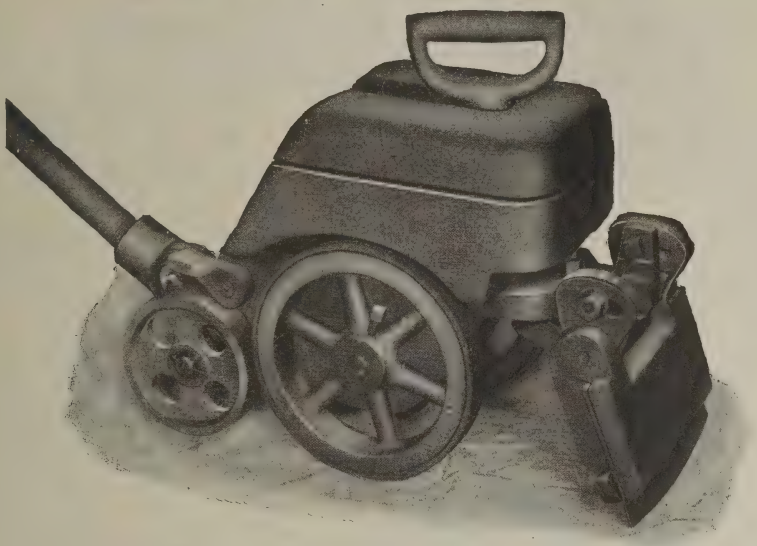

THE TRIPLE "A" SPRING DRIVEN FLOORSMOOTHER

YOU DON'T HAVE TO BUY a machine to enjoy the advantages of one. Nor do you need to place yourself under any obligations by accepting one on "free trial."

We'll Rent you one at a reasonable figure—you simply use the machine and tools as long as you like. Instead of a few days trial we'll give you the option of buying the outfit any time within **30 days** and applying the rental on the purchase price.

We guarantee The Triple "A" Spring Driven to be best floor surfacing machine in the world—it is a Scraper, Sander and Blade Sharpening Machine all-in-one.

Write for particulars of our new rental poposition **now.**

Triple "A" Machine Co.

30 North Clark St.

CHICAGO

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Pin coupon to your letter head

Send particulars of your rental proposition and folder describing The Triple "A" Spring Driven.

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Nat'l Bldr., June, 1912

Relieves Tired Backs

The WEBER DOUBLE ACTING Floor Scraper

Does Better Work

SAVES 3 MEN'S WAGES

By hand, one good man can scrape but an average of **three** "squares" a day. His wages for that are about $4.00. The "Weber" enables him to do **twelve** "squares" a day at the same wages. You actually get $16.00 worth of labor for $4.00—or save three men's wages. Besides that, it

DOES BETTER WORK

—with or against the grain—than the most skillful man can ever do by hand. Scrapes forward or backward. Any one can operate it without previous experience—and it does just as excellent work close to the baseboard as in the middle of the floor. Has all latest attachments—including one of the best Sharpening Devices ever invented.

Scrapes Either Way

Can't Chatter or Leave Waves

Try It Five Days Free

Prove what we say. Send for one. Try it on your toughest job for five days. If its work isn't the best you ever saw, return it at our expense. That's a safe way to find out, isn't it? Don't wait—write today.

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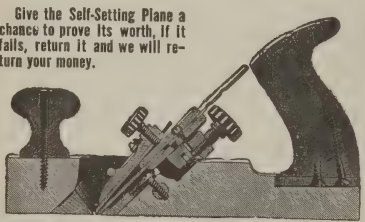
WEBER MANUFACTURING CO.
661 71st Ave., WEST ALLIS, WIS.

INTRODUCTORY TRIAL OFFER

Give the Self-Setting Plane a chance to prove its worth, if it fails, return it and we will return your money.



If the SELF-SETTING PLANES are not sold in your town and you write us saying, "I saw your trial offer in N. B.", we will send you particulars, a carpenter's pencil and our $1.00 CERTIFICATE, which we will receive as $1.00 in part payment for a SELF-SETTING PLANE, as stated in our $1.00 CERTIFICATE, and if this S. S. PLANE is unsatisfactory and returned at our expense, we will send you $1.00 more than you sent us, as the $1.00 CERTIFICATE says.

As this paper guarantees we will do as our advertisment says, you know the plane must be O. K.

ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained eaty, knurly, knotty, hard or soft wood you can find, THAT IS FREE FROM SAND OR DIRT.

If it is not worth to YOU or YOUR MEN, TWICE ITS COST, return it at our expense, as above stated.

If you send us the addresses of ten carpenters, no matter where they live, we will send you another carpenter's pencil, hard and tough.

Carpenter's Hard, Tough Pencils, 30c per dozen, postage prepaid.

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The Boss Floor Scraper

The Boss is the only Floor Scraper made that will plane a floor without leaving a square cut where knife first starts cutting. WHY? Because the Boss is made with a gauge on front to which is attached a pear shaped wheel which raises when the machine is pulled and lets the knife down gradually. ¶ The Boss can be set for any thickness of shaving. It also can be set for any shearing cut, right or left, up or down, to suit the kind of lumber. ¶ It is guaranteed to give absolute satisfaction.

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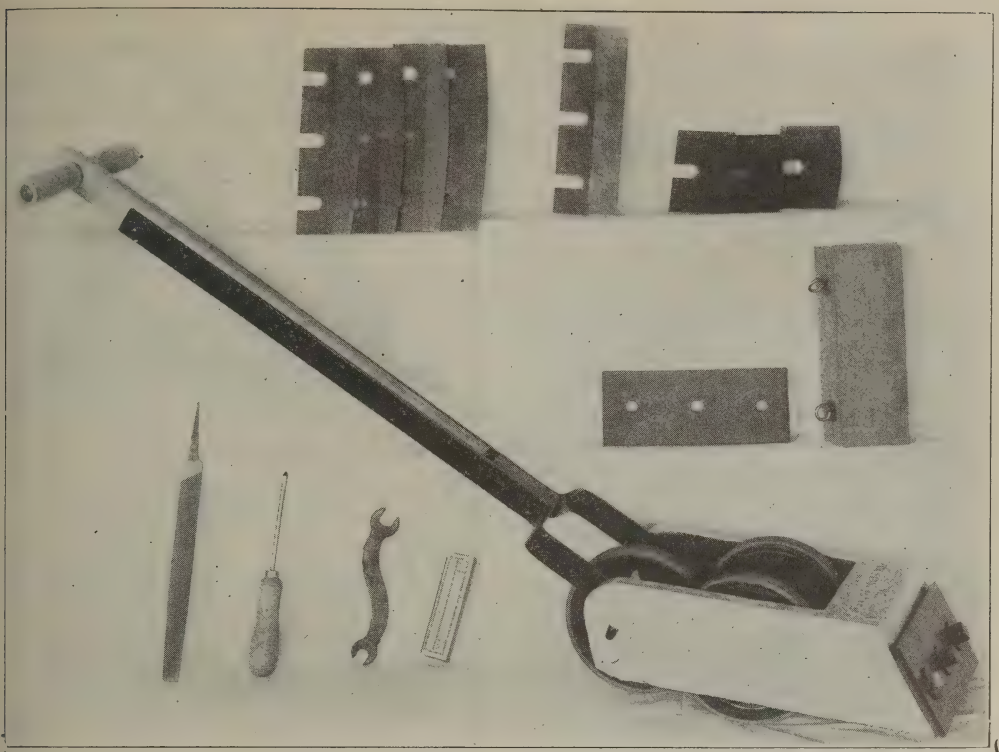
Main Office, Dwight, Ill.
MANUFACTURED ALSO IN CANADA



This Is the Floor Scraping Outfit We Sell

For $25.00

THE FOX FLOOR SCRAPER No. 1

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What You Get

Eight Blades, Fox Tempered, Filing Block, File, Burnisher and Hone for sharpening blades, Wrench and Rubber Pad.

Gives Absolute Satisfaction

It's the Best Hand Power Scraper at any price—that's why there are more Fox Scrapers in use today than all other kinds combined.

They Never Come Back

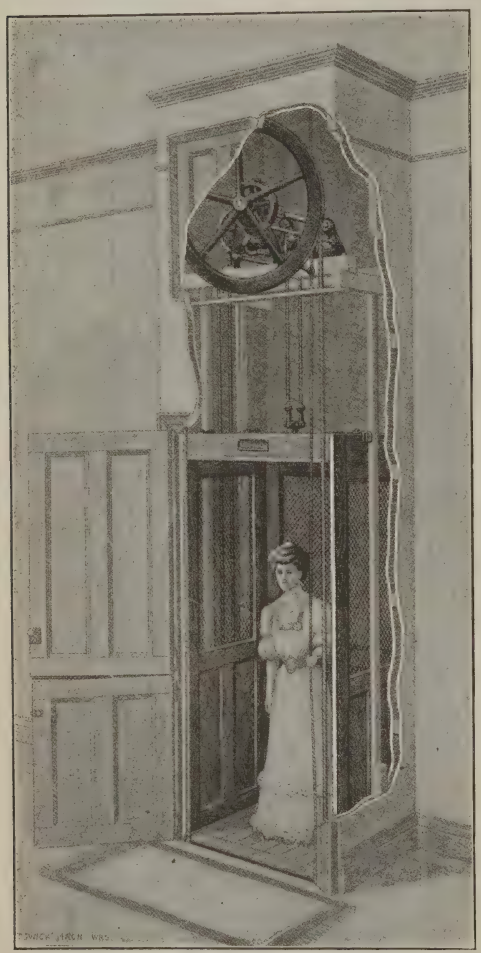
We will send the Fox Scraper to you, freight prepaid, on **5 days free trial.** If you want to keep it, send us $25, if you don't think it's worth $25 ship it back at our expense.

Fox Supply Co.
Manufacturers

112-124 King Street
Brooklyn, Wis.

Hand Power Elevators and Dumb Waiters

FOR ALL PURPOSES



Cut shows the Improved Sedgwick Hand-Power Invalid Elevator Outfit

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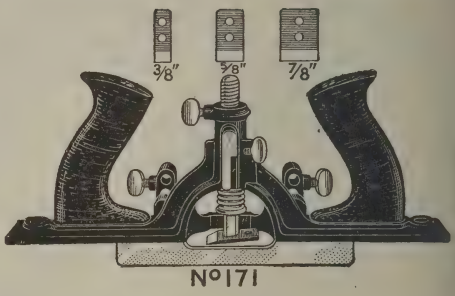
130 Liberty Street, New York

Stanley Tools



No 171

Stanley Door Trim Plane

THIS new Plane will make mortises for Butts, Face Plates, Strike Plates, Escutcheons, etc., without the use of a butt gauge or chisel. In fact it might very properly be termed a **mechanical chisel.**

Its original feature is the method of mounting the cutter which can be instantly set to work from either end of the Plane or across it. In addition, the cutter is cushioned by a spring which prevents taking a heavier chip than can easily be carried. A fence regulates the position of the cut and insures the sides of the cut being parallel. The depth of the cut is governed by a positive stop.

It is also a superior Router Plane for surfacing the bottom of grooves or other depressions parallel with the general surface of the work.

Three forged steel cutters, sharpened and honed ready for use, accompany each Plane. The body of the Plane is japanned, has nickel plated trimmings, rosewood handles, and an adjustable fence.

No. 171—11 in. long, weight 3 lbs.
List Each $2.75

A six page circular containing complete description will be sent upon request.

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NEW BRITAIN, CONN. U.S.A.

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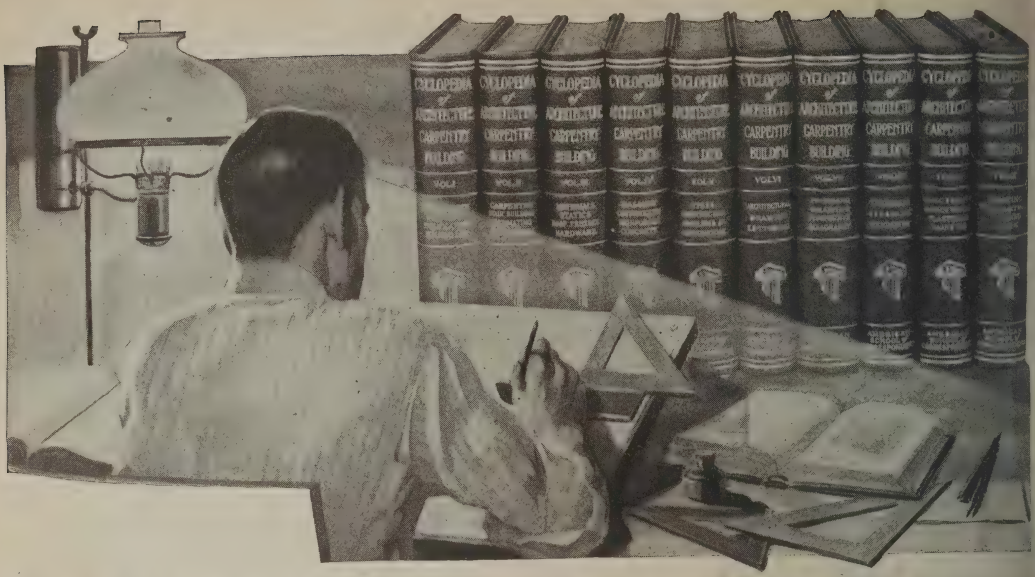

LEARN MORE AND EARN MORE

Don't be satisfied with merely pushing a saw and driving nails. Learn to PLAN as well as to work—to use your BRAIN with the ***same skill*** that you use your hands.

Learn to fill a BIG-SALARIED job—the kind of a job that hundreds of other men, with no more natural ability than you, are filling with ease and success.

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for JVLY, 1912

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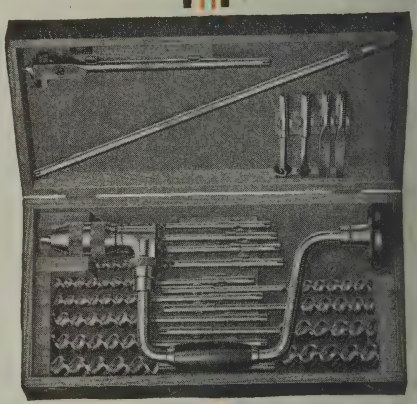
The Turned Shank

You know that the ordinary bit shank isn't wholly satisfactory. It is liable to work loose and wobble on account of its shape, causing the bending of small bits, and it is liable to pull out of the chuck when you're backing out.



We knew it, too, so we invented a shank and a method of holding it that eliminates the faults of the ordinary shank. Our new shank is turned true with a slight reverse taper at the base. This turned shank is held by a chuck devised especially for it, which has a split bushing. The chuck tightly grips the true surface of the shank and so solves the problem.

The bits with the turned shanks and the new braces made for them have been called **PRECISION TOOLS.** Try them, it will convince you that the results justify the name.

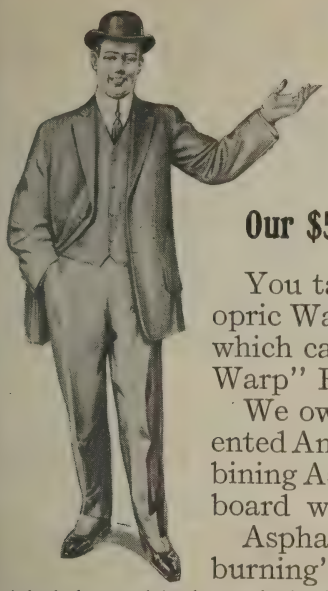
Send for bulletin on these new tools and learn what is best in bits.

The Russell Jennings Mfg. Co.

Chester, Conn.

21—91

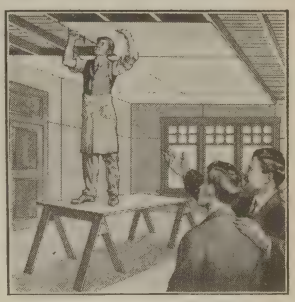
PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.



NO SIR!

Bishopric Wall Board Will Not Warp!

Our $5,000 "Anti-Warp" Bond Backs This Statement



You take no chances on Bishopric Wall Board, every sheet of which carries our $5,000 "Anti-Warp" Bond.

We own and control the patented Anti-Warp process of combining Asphalt-Mastic and fibre-board with standard LATH!

Asphalt-Mastic is a "non-burning" material, in which kiln-dried dressed lath are imbedded under a pressure of 500 pounds to the square inch. The other side of the Asphalt-Mastic is surfaced with heavy sized fibre-board.

This wonderful combination produces a Wall Board that is impervious to moisture—that will never *warp*, crack, shrink or swell—the famous

BISHOPRIC WALL BOARD

Costs 50 per cent less to *apply* than plastering and saves a month's time in building—does away with the bother and muss of the slow, expensive "Lath-and-plaster" method.

Goes on dry. Walls ready for paint, paper, burlap or kalsomine *right off!* House ready for occupancy in double-quick time!

The beautiful, solid, sanitary, durable "Bishopric" walls are a delight to home owners.

Bishopric Wall Board is as far ahead of all other wall boards as it is in advance of plastering.

Write for Free Book, Sample, Set of Architect's Working Plans for Model House and a Copy of Our $5,000 "Anti-Warp" Bond

DEALERS!
Write for Great Exclusive Agency Proposition

We can't begin to tell you all the facts, all the big advantages of Bishopric Asphalt-Mastic Wall Board and Sheathing.

It's all in the book. Enclose 6c in stamps to pay postage and packing on big samples, plans, etc.

(62)

The Mastic Wall Board and Roofing Mfg. Co.
326 Este Avenue, Cincinnati, Ohio

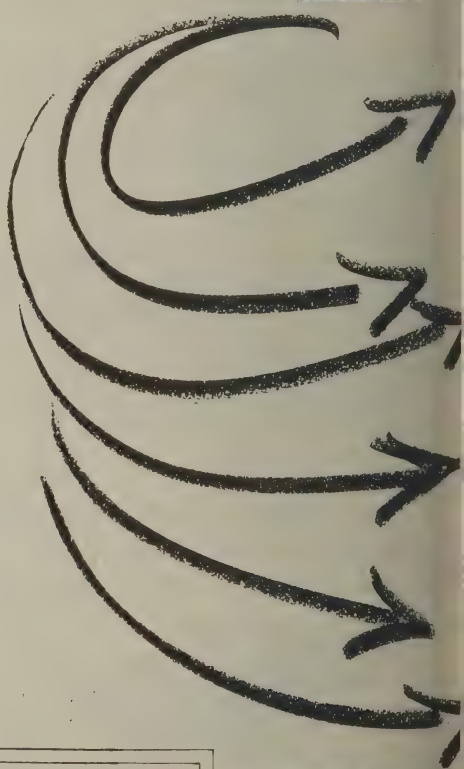
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Good Carpenters Know These Good White Pine Facts

OTHER FOLKS ARE RAPIDLY LEARNING.

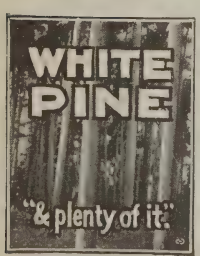
And don't forget that notwithstanding the known **superiority** of WHITE (and NORWAY) Pine and the tremendous quantities of it used,
there is still "plenty of it."

FOR



Mr. Carpenter:—

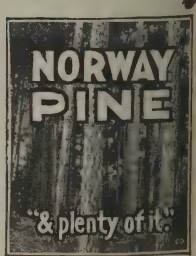
We will give you the names of reliable dealers who will furnish at fair prices *all the WHITE (and NORWAY) Pine you want, with quick deliveries assured.*



WRITE US FOR COPY OF NEW FREE BOOK "WHITE PINE VALUE IN HOME BUILDING."

You will find it full of valuable ideas about how and why to use White Pine in ***YOUR*** NEW HOME. You can't afford to "go it blind" on this question. Write today for your copy of entirely NEW booklet.

NORTHERN PINE Mnfctrs.' Assn.,
1118 Lumber Exchange Minneapolis, Minn.



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

WHITE PINE

"THE PEOPLE'S LUMBER SINCE THE PILGRIMS LANDED"

SASH & FRAMES

DOORS & TRIM

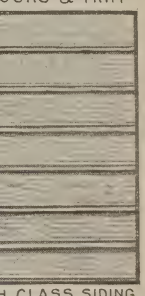
Insist upon White Pine for Your House

("The Wood America is Mostly Built of.")

The predominant use of White Pine in home building for more than 250 years demonstrates conclusively that this is the one wood chosen by the best judges for

Siding, Sash, Doors, Stair Railings, Exterior Trim, Pillars, Cornices, Pergolas.

STAIR RAILS



HIGH CLASS SIDING

Your carpenter will tell you it is the most *workable* wood. Your painter will tell you how well it takes and holds paint. Your own eyes will convince you of its beautiful texture, grain and finishing qualities.

The evidence of centuries of use (in buildings still standing) *proves* its durability.

Norway Pine, (the half-brother of White Pine) is the only wood that is "as good as White Pine" for most uses.

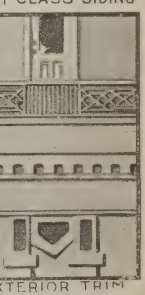
For sturdy, structural members of a house, such as roof-boards, studding, joists and sills, and for screen-doors and windows, Norway Pine is *ideal and its Cost is Low.*

The *kind* of wood you use is one of the most important factors in home building. Your architect will tell you how notably good White Pine is for all its proper uses.

Wherever carved wood-work is desirable, as in grilles, newel-posts, panelling, colonial pillars—White Pine is supreme — just as it has been for 250 years.

AND THERE'S "PLENTY OF IT" YET.

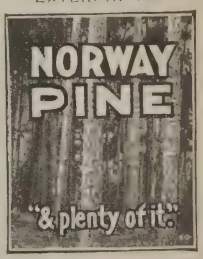
COLUMNS ETC



EXTERIOR TRIM

WRITE US FOR COPY OF NEW FREE BOOK "WHITE PINE VALUE IN HOME BUILDING."

You will find it full of valuable ideas about how and why to use White Pine in ***YOUR*** NEW HOME. You can't afford to "go it blind" on this question. Write today for your copy of entirely NEW booklet.



NORTHERN PINE Mnfctrs.' Assn.,
1118 Lumber Exchange Minneapolis, Minn.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The "ABC" of BEAVER BOARD Construction

The seventh of a series of twelve monthly talks to Carpenters about the practical use of *Beaver Board*, the *pure-wood-fibre* wall and ceiling material that is durable, economical, artistic; has none of the disadvantages of lath, plaster and wall-paper; and is appropriate to any type of building new or old.*

Beaver Board is essentially a proposition for Carpenters and Builders.

CHAPTER VII

How Carpenters Profit by Our Free Architectural Service

THE hustling carpenter who wants to get inside work all the year round, build up a reputation and establish a profitable and growing business should investigate what we are doing in this line.

The service of our Architectural Designing Department is absolutely free—and is even more valuable to the carpenters than to the individual users.

*These Chapters began in the January number. We'll send you duplicate of any you've missed.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

This is the way to get the most out of it:

1. Send for the booklet "Beaver Board and Its Uses" (see illustration 1) and get *all* the facts about the wonderful possibilities of Beaver Board.

2. With the book you'll get a blank application for estimate (see illustration 2) which you can quickly fill out, giving dimensions of room, distances of joists and studs, position of openings, etc. If you are doing a whole house, tell us the number of rooms when you write for the booklet and we'll send extra blanks.

3. When you get the blanks or plans, we will send you complete estimate and full instructions. We will also send blue prints (see illustration 3) showing an appropriate scheme of panel arrangement that will be artistic and work out most economically. *This puts you under no obligation whatever.*

4. All necessary instructions for applying Beaver Board are carefully packed with each shipment; and full details as to nails, decorative strips, mouldings and plate-rails, panel sizes, etc., are also explained in the booklet.

By making use of this free service, many a man has made a reputation for himself as an expert at Beaver Boarding. You can do it. Get busy. It's pleasant work, it's profitable, and the demand for it is spreading at a tremendous rate Write today.

BEAVER BOARD

PURE-WOOD-FIBRE

WALLS & CEILINGS

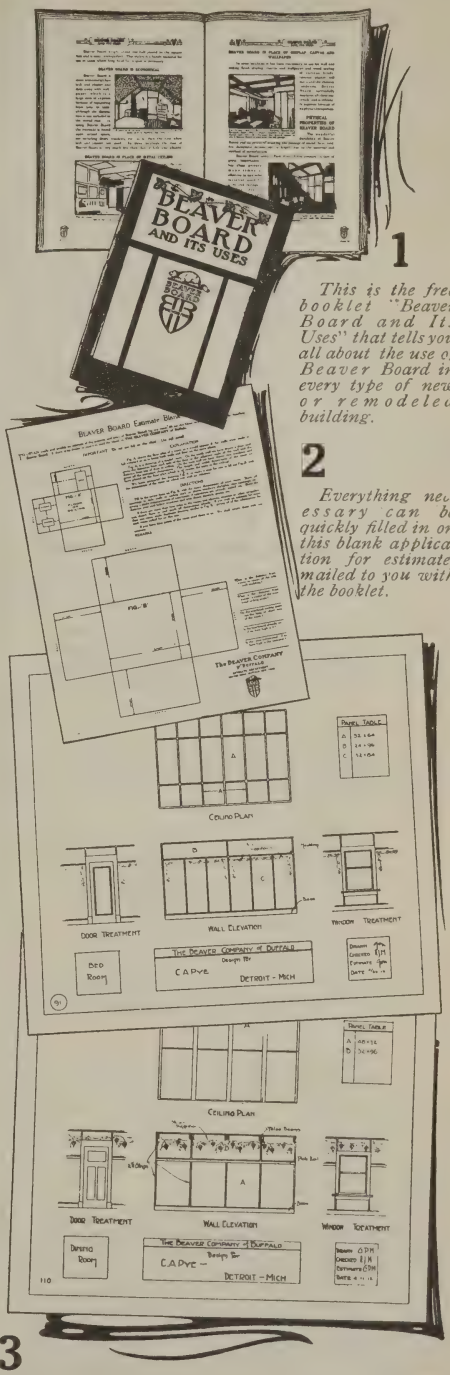
BEAVER BOARD

PURE WOOD FIBRE

THE BEAVER COMPANIES

Address All Correspondence

United States: - - - 449 Beaver Road, Buffalo, N. Y.
Canada - - - 389 Wall St., Beaverdale, Ottawa, Can.
Great Britain, 4 Southampton Row, Russell Sq., London.



1

This is the free booklet "Beaver Board and Its Uses" that tells you all about the use of Beaver Board in every type of new or remodeled building.

2

Everything necessary can be quickly filled in on this blank application for estimate, mailed to you with the booklet.

3

When desired, we will send blue prints, suggesting harmonious and effective panel designs, with full instructions for application.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

DULLKOTE PAINT Makes Wall-board Washable

A "DULLKOTED" surface can be washed like tile. DULL KOTE is applied to the wall-board with a brush, in the ordinary manner, and can be readily cleaned with a sponge and water.

It dries hard—leaves no brush marks or laps—wears like iron—and is *very* economical. For use wherever wall-board is used, in residences, schools, stores and public buildings.

The wide variety of shades allows of handsome decorative treatments. Write for our free color chart, and several excellent suggestions for interior decoration.

The R. F. Johnston Paint Co.

Pearl & Main Sts.
Cincinnati,
Ohio

Builders Who Know This Modern Wall Lining Use No Other

M. Barry & Son, of Chicago, Ill., write: "Compo-Board is the best of its kind we have ever used. It is cheaper, cleaner and more easily put on than any material we know of." So say hundreds of others who know from experience. For instance: N. A. Beck, a contractor in Burlington, Iowa, won the everlasting gratitude of a customer by using Compo-Board directly over a plaster ceiling that had begun to crack and fall off in spots. Thos. S. Whitbank, a real estate broker in Philadelphia, uses thousands of feet in remodeling houses. Woodruff Mfg. Co. of Washington, D. C., use many thousand feet in government contracts.

The exclusive features of Compo-Board make it the most satisfactory wall lining. The basis of its construction is a wooden slat, arranged so the grain of the wood runs in different directions, making it non-warpable. It is non-porous and airtight—hence, impervious to cold, heat, moisture and vermin. Can be papered, painted or kalsomined more satisfactorily than plaster, with or without panels. Write for sample and interesting booklet containing many money-making hints for contractors, builders, architects and home owners.

Northwestern Compo-Board Co.

5776 Lyndale Ave. No., Minneapolis, Minn.

Compo-Board

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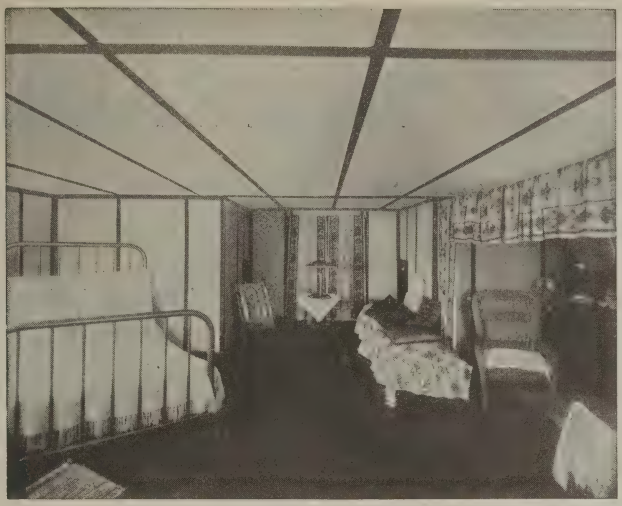


Utility Wall Board is a tough fibre board put together with two insulations of Natural Water Proof Asphalt, rolled under tremendous pressure into one solid compact sheet and surfaced on both sides with special moisture proofing—

It is the only Wall Board Made Under This Scientific Moisture Proof Process

UTILITY WALL BOARD

takes the place of both lath and plaster—It is very tough and durable—It is easily cut with an ordinary saw and is nailed direct to the studding.

It will not warp, or crack, or shrink—and may be decorated in any style desired.

Anyone who can use a hammer and saw can put it on and there is none of the muss and dirt of plastering—you don't even have to wait for it to dry.

It is used in building the new house—and in making over the old—Put it on right over old and cracked plaster if you wish—The cost is less than lath and plaster.

We want to send a sample to every carpenter and builder and home owner—Write for yours

THE HEPPES COMPANY

4502 FILLMORE STREET CHICAGO, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

PAINE

KLIMAX

KORELOCK

"From PAINE Forests

"The TRAIL of the KORELOCK
TREE TO FINISHED PRODUCT"

More than Two-Thirds of the
Reach the user through the

KLIMAX

We invite correspondence from Contractors
We respectfully remind you that the only
***promptly** is to apply for same **at once**.*

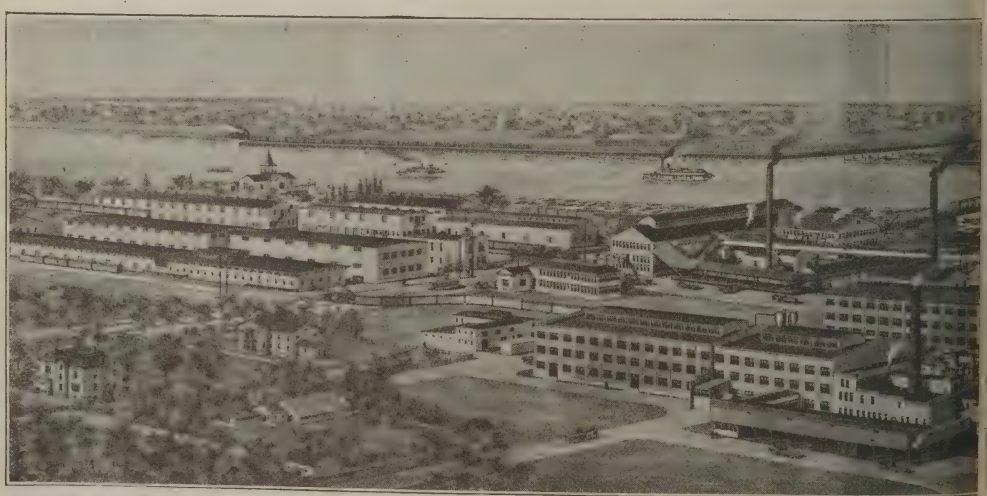
We Manufacture Everything Known

PAIN

KLIMAX

"ORIGINATORS OF THE STANDARD

OSHKOSH WIS



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KORELOCK

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IT WILL HELP.

KORELOCK

PAINE

to Korelock Doors"

KLIMAX

DOOR" leads straight "FROM
without leaving PAINE Ownership.

World's Standard Veneered Doors
PAINE PLANT Shown Below.

nd Builders anywhere in the world.
vay to secure our New CATALOG "C"
(Requests met in order received).

KORELOCK

in Millwork—in Every Kind of Wood

LUMBER CO., LTD.

HARDWOOD VENEERED DOOR."

CONSIN, U. S. A.

KORELOCK

KLIMAX

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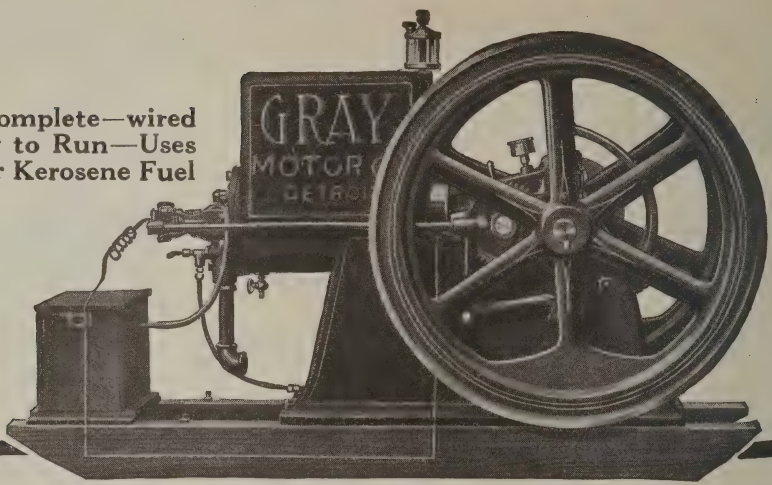
NAT. BUILDER

Shipped Complete—wired up—Ready to Run—Uses Gasoline or Kerosene Fuel



RELIABLE POWER FOR THE CONTRACTOR AND BUILDER

Here's the ideal gasoline engine for the contractor and builder. It could not be better adapted to the requirements of the average man in this business if it were made especially to order for his particular needs.

Will run the band saw, emery wheel, cutoff saw, jig saw, combination wood-worker, hoisting rigs, cement mixers, etc.

Especially well adapted to running the various wood-working machines advertised in this publication.

Use it in the shop or out of doors—makes an ideal portable outfit to take around to the different jobs.

Runs in any kind of weather—requires very little attention—furnishes **big** power or little power as required, and uses fuel in proportion to the power used—the automatic governor works perfectly.

Bigger Profits on Every Job

The first cost of this high grade—guaranteed engine is only a small consideration—they make a paying investment.

The cost for fuel is very small—will run **all day** doing the work of from 2 to 4 men at a cost of from 20 to 40 cents, depending upon the work to be done and the power needed.

Hoisting Rigs

We can quote you a very attractive price on a complete 4 H. P. hoisting rig—if interested write for special information on this subject and prices.

We'll Help You Make the Right Selection

The engine shown above is a 4 H. P.—it delivers **big honest horse power too**—it's the engine that will answer the requirements of a big majority of contractors and builders.

In some cases a larger engine might be required or a smaller size might do the work you have to do.

We have other sizes to select from, 1½ H. P., 2½ H. P. (and by the way, the 2½ H. P. is another engine that we can recommend especially to carpenters and builders), 6 H. P., and 12 H. P.

If you are not sure about the exact amount of power required, get our specifications—tell us what work you want the engine to do—our service department will give you an honest recommendation of the proper power for your need.

There is no use in getting more power than you need—it's a waste of money. Then again you will be dissatisfied if you get an engine that won't do all the work you have for it to do.

Write and ask questions—get the benefit of our experience—it's to our interest to tell you and tell you **right.**

30 Days Trial

We are willing to ship you one of these engines to try out at your own work—give it hard jobs to do every day—test it out thoroughly—if it does not prove to be everything we claim for it, we take the engine back and pay the freight.

Write today for our big engine catalog and ask for information about this **special trial offer.**

GRAY MOTOR COMPANY, 677 U. S. Motors Building. **Detroit, Mich.**

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THESE PHOTOGRAPHS REPRODUCED BY COURTESY OF P. F. COLLIER & SON, PUBLISHERS

The Few That Will Stay—The Crowd That Will Go

Digging the "Big Ditch"

When the Panama Canal is finished, the few to be retained will be the experts. The crowd that will go are the 28,536 untrained workers.

No more striking example of the relative value of trained and untrained men can be found anywhere than this. Here you see exactly what happens when a large working force is to be reduced. The **trained** men **stay**—the **untrained go.**

You can get out of the **crowd** of untrained workers, and join the **few** whose training keeps them always in demand. The International Correspondence Schools will help you win success in your own chosen line of work.

It is immaterial who you are, what you do, where you live, what you earn, or how little schooling you have had. So long as you can read and write, and are ambitious, there is an I. C. S. way for you. All you have to do is to show your ambition by marking and mailing the attached coupon today. The only thing between you and success is the coupon.

Then, Mark and Mail the Coupon NOW

International Correspondence Schools
Box 1332, SCRANTON, PA.

Please explain, without further obligation on my part, how I can qualify for a higher salary and advancement to the position, trade, or profession before which I have marked X.

Architecture	Mechanical Engineer
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Concrete Construction	Mining Engineer
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Present Occupation _____

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE STANDARD PORTABLE COMBINATION WOODWORKER

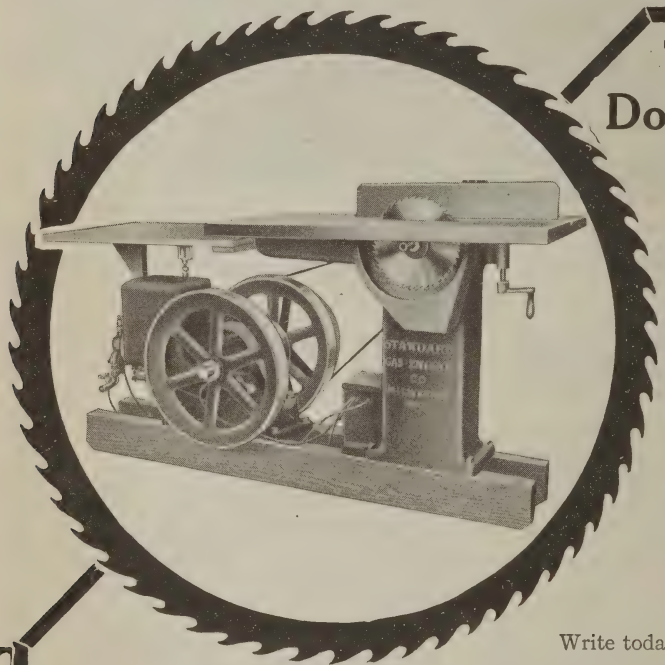
NINE MACHINES IN ONE EQUIPPED WITH 6 H. P. ENGINE

SEND FOR ILLUSTRATED CATALOGUE

ATLANTIC ENGINE COMPANY, Inc.

MERCER STREET - - - - - MEADVILLE, PA.

CANADIAN OFFICE, BRIDGEBURG, ONT.



This Saw Rig Does 5 Men's Work

Carpenters, Contractors, Lumber Dealers, Job Shops, etc., can save 5 men's time by using one of our

STANDARD

Saw Rigs

They are the most rigid and practical Woodworkers on the market—economical in fuel, dependable in service and right in price.

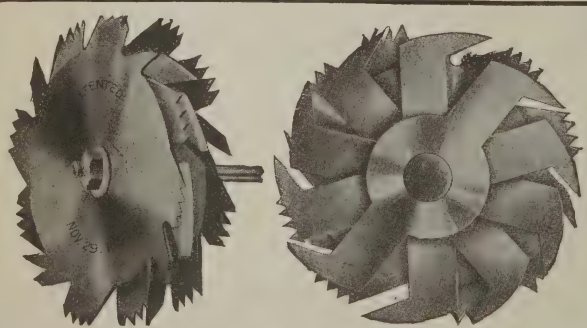
Satisfaction or Money Back

Outfit is shipped ready to run with oiler, wrenches, cross-cut saw, rip saw, dado-head and emery wheel.

Write today for prices and other information.

STANDARD GAS ENGINE COMPANY, Inc.

5th Floor, Caswell Building Milwaukee, Wisconsin



Showing Arrangement of Cutters

HUTHER BROS. PATENT GROOVER OR DADO HEAD

Will Save Cost in Three Days Use

Can Be Used on Any Circular Saw Mandrel

For cutting any width groove from ⅛" to 2" or over. Will cut a perfect groove, either with or across the grain, and leaves edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

HUTHER BROS. SAW MFG. CO.

500 University Ave. Rochester, N. Y.

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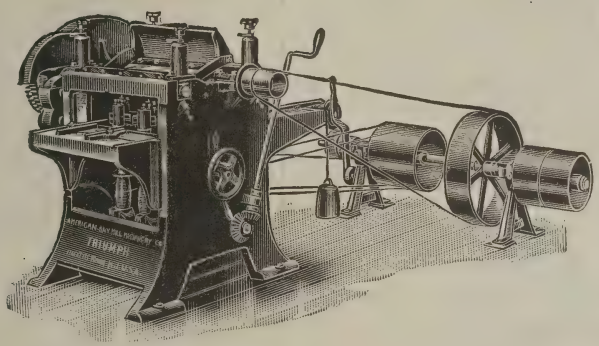
American "Triumph"
Planer, Matcher and Moulder



Here is a machine which is so far ahead of any other supposedly in its class that there is really no comparison. You must study it, detail by detail—or let us tell you more about it than we have space for here—to realize its many advantages.

One thing we want to emphasize. **The "Triumph," though a small machine, turns out work as uniform, accurate and high in quality as the largest, most expensive machines.**

The explanation is that the "Triumph" is better designed, more strongly and rigidly built, has a higher class of workmanship and more attention to the fine details, than any other small planer.

We could not make the "Triumph" Planer better than it is if we charged twice the price for it.

Here is what the small mill or shop or contractor equipped with a "Triumph" can do:—planing and matching; working flooring, ceiling, siding, casing, wainscoting; a large variety of moulding and trim.

Write us at once for the "Triumph" pamphlet. See for yourself what splendid value the "Triumph" is. And be convinced.

American Saw Mill Machinery Co.

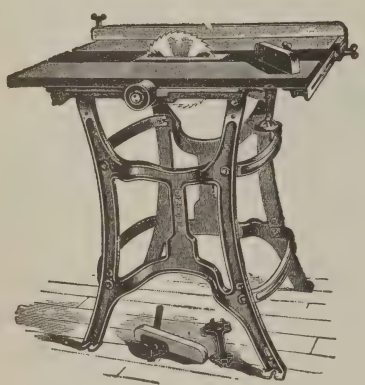
80 Laight St., HACKETTSTOWN, N. J. **1650 Hudson Terminal, NEW YORK CITY**

BUILDER ALSO OF THE

"American" Contractors Portable Variety Wood-Worker

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

No. 8 "Union" Combination Saw



A well-built light power machine, at a low cost. Has a wide range for work. Will rip stuff up to 3½ inches thick, also cut-off, miter, and with attachments, bore, edge-mould, groove, dado, etc.

The No. 8 Union Saw may be easily connected to electric motor or gasoline engine and complete outfit mounted on skids to move from one job to another.

Send for Catalogue A, describing our complete line of Foot, Hand and Light-Power Wood-Working Machinery.

The Seneca Falls Mfg. Co.

629 Water Street

Seneca Falls, N. Y., U. S. A.

275

One of Our Specials

27 inch Complete ⅜ Band Saw
Wright Roller Guide
Weight 800 lbs.
$55.00

32 inch Complete ⅜ Band Saw
Wright Roller Guide
Weight 1100 lbs.
$75.00

Prices F. O. B. Factory. Also a complete line of wood working machinery.
Write us about our special offers.

United Machinery Co.

88-89 Centre St. New York, N.Y.

$125.00 Buys Four Machines

- A Band Saw
- A Saw Bench
- An 8" Jointer & Planer
- A Mortiser and Borer

This solid cast iron UNIVERSAL WOODWORKER is the biggest value ever offered. We furnish the machine complete at this price including tools, belting, heavy base with wheels, one of which swivels so that a man can move the machine easily. It consists of four of the principal machines used in a mill, all set up ready for instant use. Why buy a wooden or angle frame machine that must be set up each time you want to use it? Here is a guaranteed superior machine for one-third to one-half the price others ask. It is a better value in every way. We guarantee it absolutely and will refund your money if you are not perfectly satisfied. You should see our illustrated literature on this wonderful proposition before you buy a WOODWORKER.

Write To-day.

THE TANNEWITZ WORKS

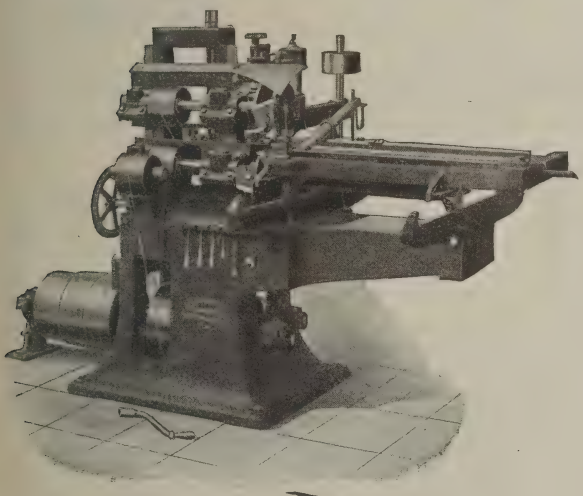
317 NORTH FRONT STREET

GRAND RAPIDS - - MICHIGAN

NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Established 1847 SMITH OF SMITHVILLE Incorporated 1878

Woodworking Machinery



Single-End and Double-End

Tenoners

Made in many sizes and styles for all purposes.

Send for Literature relating to Tenoners and other Wood-working Machines

H. B. Smith Machine Co.

Smithville, N. J., U. S. A.

New York Chicago Atlanta San Francisco

MARSTON'S

Hand and Foot Power Circular Saw

Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

Send for Catalog

J. M. MARSTON & CO. 193 Ruggles Street BOSTON, - MASS.

Move the Old House to Another Lot

Instead of Wrecking It

You Can Make More Money by Doing So

THE LA PLANT HEAVY HOUSE MOVING TRUCKS ARE MADE OF STEEL

On scientific lines—are interchangeable so they can be worked singly, in pairs or in fours.

WRITE FOR CATALOG N

and see how easy it is to wheel a building a mile in a day—and how little the cost is for La Plant outfit compared with the profit to be made in moving houses instead of wrecking them.

LA PLANT TOOL CO.

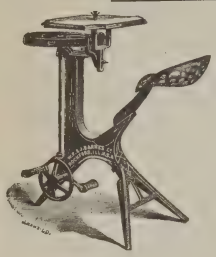
900 E. Nevada St., Marshalltown, Iowa

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT. BUILDER

Barnes Hand and Foot Power Machinery

Complete Outfit for CARPENTERS AND BUILDERS



Improved Former has an adjustable table. Knives can be instantly reversed to suit the grain of wood. Speed of knife is 2,500 per minute, thus insuring smooth work.

Improved No. 7 Scroll Saw

Warranted to be well made; will saw pine three inches thick at the rate of one foot per minute. Other woods in same proportion according to hardness. Price, $15.00.

We make Sixty Styles of Knives
SEND FOR NEW CATALOG

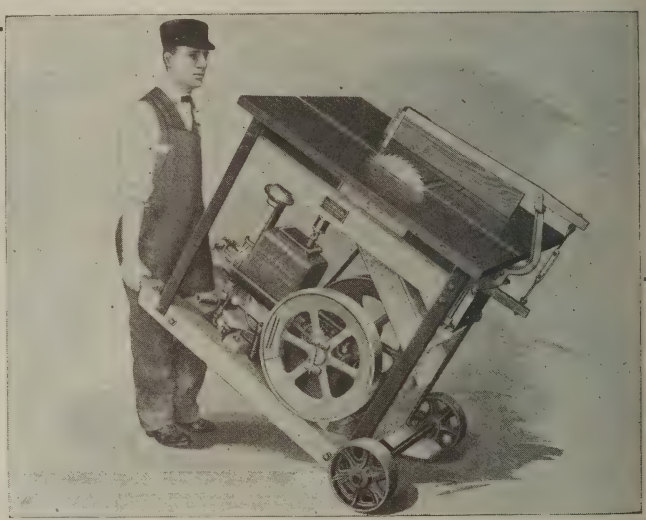
W. F. & JOHN BARNES CO. 436 RUBY STREET ROCKFORD, ILL.

Wheel It

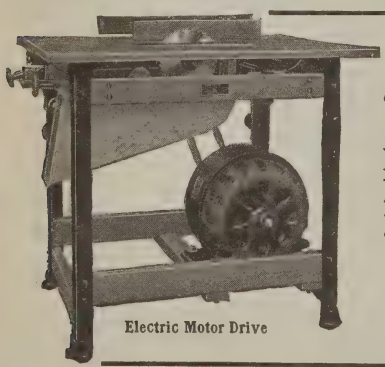
To any part of your job. This portable Saw Rig is our No. 3 Combination Woodworker which will do twelve different operations.

We make portable saw rigs in four different sizes.

Write for our colored wall hanger



C. H. & E. MANUFACTURING CO., Inc. 319 Mineral Street MILWAUKEE, WIS.



Electric Motor Drive

9 MACHINES IN 1

"Grimm Woodworker"

You can have at your service either a Rip-Saw, Cross-Cut Saw, Jig Saw, Dado Head, Jointer, Emery Wheel, Boring Machine, Sander or Moulder. A Grimm Woodworker will increase your earnings, save time, etc. Built with belt or electric motor drive, also gasoline engine for portable use. Thousands in use giving complete satisfaction.

Send for catalog and prices.

Grimm Manufacturing Co., 42 Erie Street, BUFFALO, N. Y.

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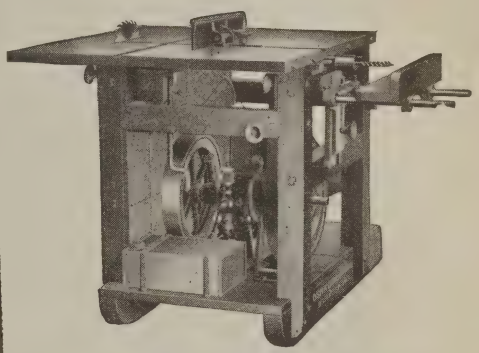
Test It FREE on Some Hard Job— Make It Show You First

"Guaranteed for Life"

TRADE OSHKOSH MARK

EVEREADY SAW RIG

At our risk, our cost, without obligation on your part, try out this outfit!



Comes Complete with Free Attachments for Jig Sawing, Boring, Dadoing, Jointing, Mitering, Sanding, Etc., Etc.

Simply say you want to know just how this Rig, on other builders' jobs, often actually

Has Saved Contractors Over $20.00 a Week!

Have us tell you how easy we make it for you to try it SIX WORKING DAYS FREE on your own jobs. Hear why you commit yourself to nothing by asking about it or by sending for the **Eveready.**

Give It the Hardest Work You Have

We invite you to test the Eveready as a MONEY SAVER—for quick, clean ripping or cross-cutting, with one man and a helper running it. If it doesn't do better and quicker work than 25 skilled men—if it doesn't show you a saw-job saving of $20.00 a week, run full time—why, we lose an order, but YOU GAIN ALL THE WORK IT DOES DO FOR YOU! Suppose you ask for details.

Free Attachment
Cuts True Tenons

Free Attachment
Does A-1 Jig-Sawing

Free Attachment
Cuts Dadoes Quick

Free Attachments
For Boring and Sanding

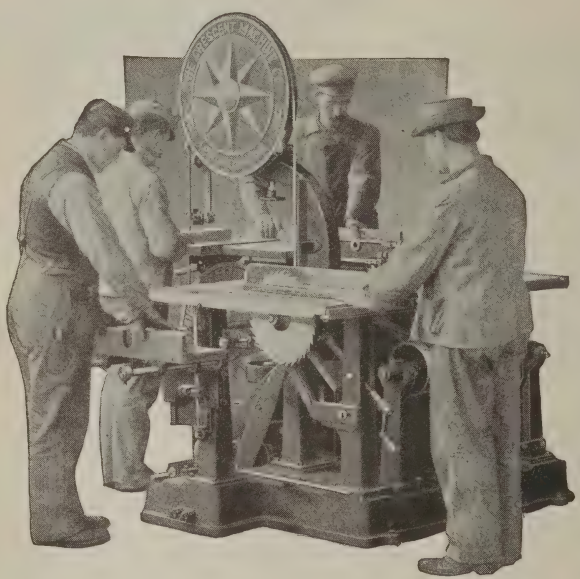
Please understand that there is no bear-trap hidden here. You are asked to test the Eveready on your own work, your own way, without cost or obligation. Will you learn why we offer this Free Trial? Write

Oshkosh Manufacturing Company
414 South Main Street
Oshkosh, Wis.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

—FACTS—

WITH the No. 51 Universal Wood-worker in your shop, you can get out a job of wood-work when you want it. You will not be dependent on outside sources for some important material when a builder is pressing you to complete work in a hurry. These things mean that you will be enabled to figure closer, you will get through your work with less worry, and consequently will be able to do more in the same season than if you depend altogether on getting your work outside.



From this cut you can see the four-in-one feature of the 51 Universal Wood-worker. This alone means the investment in only one machine to get the work of four machines.

The No. 51 Universal Wood-worker can and will save money for you. It is impossible to completely describe this machine in this small space, but we are sure you will be favorably impressed after reading our special catalog No. 51. Send for a copy today. It means money for you.

The Crescent Machine Co.

10 Main Street **Leetonia, Ohio, U. S. A.**

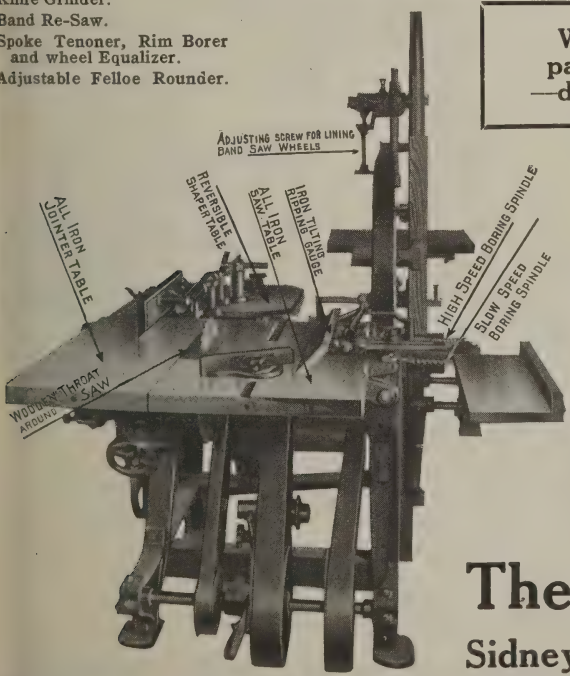
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

A Famous Message

Sixteen Wood-Working Machines In One

27″ Band Saw.
12″ Jointer.
Saw Table (with raising and lowering arbor).
Single Spindle Shaper.
Borer.
Pony Planer.
Tongue and Pole Rounder.
Hollow Chisel Mortiser.
Single end Tenoner
Drum Sander.
Disc Sander.
Emery Grinder.
Knife Grinder.
Band Re-Saw.
Spoke Tenoner, Rim Borer and wheel Equalizer.
Adjustable Felloe Rounder.

Write for particulars —don't delay


ADJUSTING SCREW FOR LINING BAND SAW WHEELS
REVERSIBLE SHAPER TABLE
ALL IRON SAW TABLE
IRON TILTING RIBBING GAUGE
ALL IRON JOINTER TABLE
HIGH SPEED BORING SPINDLE
SLOW SPEED BORING SPINDLE
WOODEN THROAT SAW

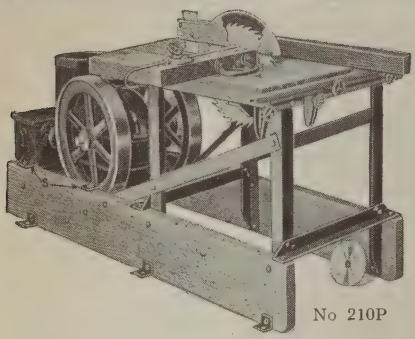
— — Stationary or Portable.
— — Original and Reliable.
— — 1250 in use.
— — Guaranteed for Life.
— — Four men can work at the same time.
— — Easily operated.
— — All steel and iron construction.
— — Styles for every kind of woodworking business.

The Sidney Tool Co.

Sidney, Ohio

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Parks Portable Single and Combination Woodworking Outfits

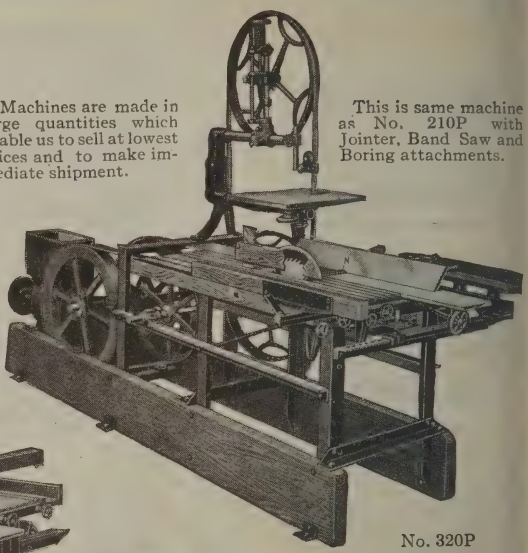


No 210P

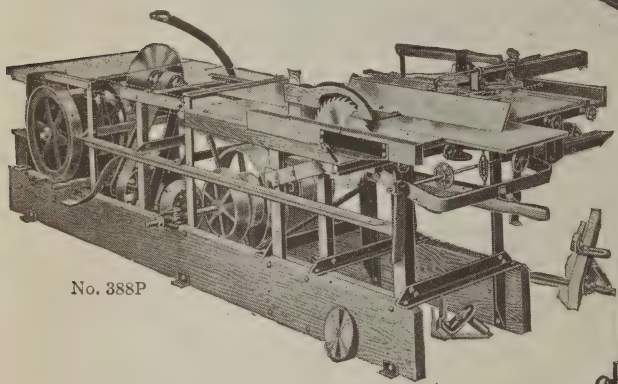
Circular Rip and Cross-Cut Saw
Price complete with Engine. $74.50

Machines are made in large quantities which enable us to sell at lowest prices and to make immediate shipment.

This is same machine as No. 210P with Jointer, Band Saw and Boring attachments.



No. 320P

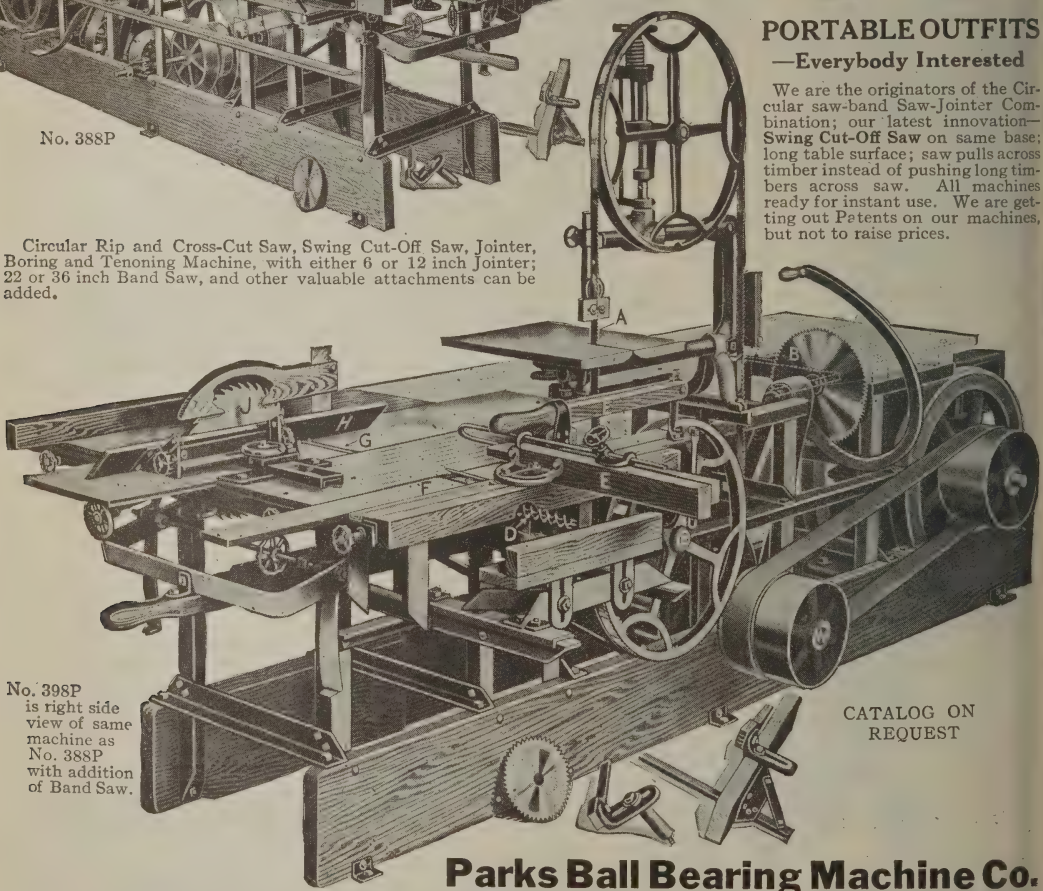


No. 388P

Circular Rip and Cross-Cut Saw, Swing Cut-Off Saw, Jointer, Boring and Tenoning Machine, with either 6 or 12 inch Jointer; 22 or 36 inch Band Saw, and other valuable attachments can be added.

PORTABLE OUTFITS
—Everybody Interested

We are the originators of the Circular saw-band Saw-Jointer Combination; our latest innovation—**Swing Cut-Off Saw** on same base; long table surface; saw pulls across timber instead of pushing long timbers across saw. All machines ready for instant use. We are getting out Patents on our machines, but not to raise prices.



No. 398P is right side view of same machine as No. 388P with addition of Band Saw.

CATALOG ON REQUEST

Parks Ball Bearing Machine Co.

Knowlton and Fergus Sts. CINCINNATI, OHIO, U. S. A.

NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

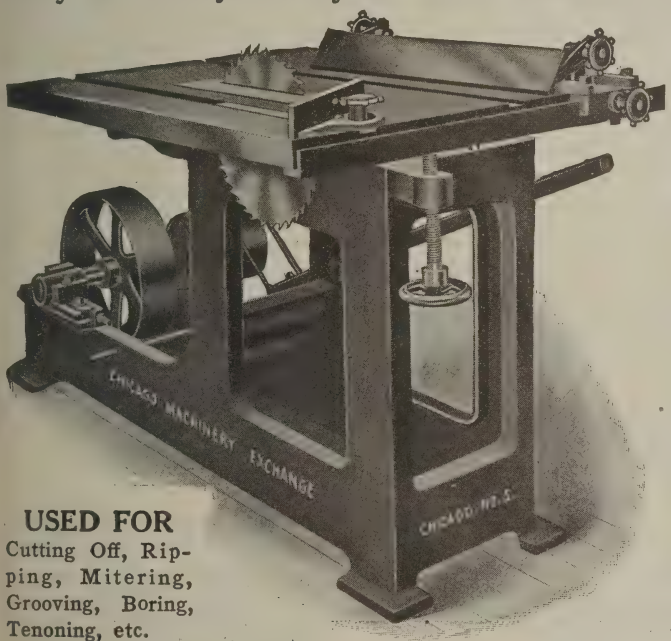
$144.00 FOR BOTH

To Contractors and Builders

These Two Machines are the Best "Buy" You Can Find Anywhere

They Are Always Ready for Work Without Any Changing and will stand the hardest kind of usage without getting out of order.

Our low price of $144.00 for the 2 machines includes belt for saw arbor, countershaft, one 12 in. rip saw, one 12 in. cut-off saw, five boring bits—¼ in., 5/16 in., ⅜ in., ½ in., ¾ in.—and countershaft, one pair of knives and guard for jointer.



USED FOR
Cutting Off, Ripping, Mitering, Grooving, Boring, Tenoning, etc.

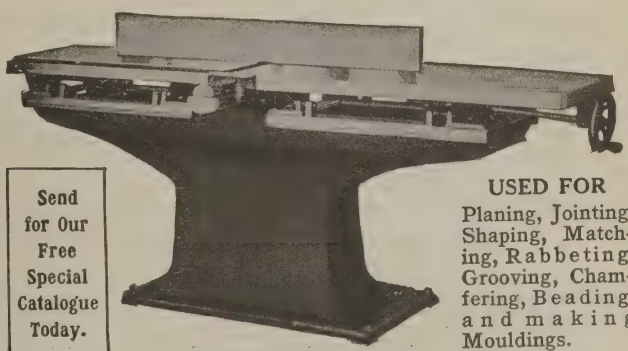
Chicago No. 5 Combination Saw Table

Ask for Price on One if You Cannot Use Both

THE WORLD'S LARGEST AND MOST COMPLETE STOCK of Woodworking Machinery, Tools, and Supplies—everything for the woodworker.

We issue a Catalogue of Machines Especially Adapted to Contractors' and Builders' Use.

Send for Our Free Special Catalogue Today.



USED FOR
Planing, Jointing, Shaping, Matching, Rabbeting, Grooving, Chamfering, Beading, and making Mouldings.

Chicago 12-Inch Jointer and Planer

Chicago Machinery Exchange

1217 to 1225 Washington Blvd. Chicago, Ill.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

This Machine Will Increase Your Profits

THE FOX FLOOR SCRAPER

IS THE MOST PRACTICAL SCRAPER BUILT. SMOOTHS A FLOOR PERFECTLY.

You Will Save Enough on Three Days' Work to Pay for the Fox Scraper. We Can Back These Statements.

It Will Cost You One Penny

To Try It

We will send you this machine on 5 days Free Trial, freight prepaid. A post-card will bring it to you.

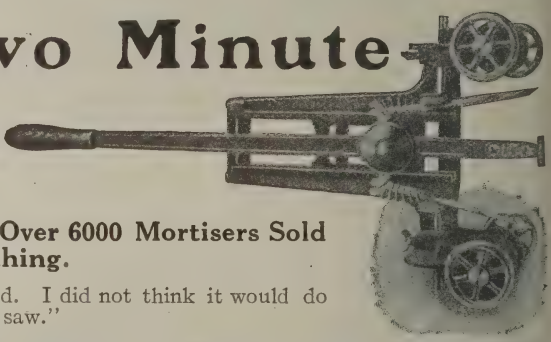
FOX SUPPLY CO.

112-124 King Street
BROOKLYN, WIS.

Miller's Two Minute

Lever Lock

MORTISER



Actual Use of Tool ½ Minute

Chisels the opening for Locks. Over 6000 Mortisers Sold Means Something.

One builder wrote us: "I was surprised. I did not think it would do the work so quick. This is the best I ever saw."

THINK THIS OVER, MR. CONTRACTOR AND BUILDER

Our patent double edge, side cutting chisel can cut more wood, four times more rapidly and 100% less exertion than any boring bit. Mortise to be of the same size.

MILLER'S TWO MINUTE LOCK MORTISERS

Guaranteed to be as we represent, and will send on trial to any reliable contractor and builder. We will return all money paid if it does not cut an opening in a door for a mortise lock in three minutes.

We also make a Butt Mortiser and Rule Gauge which cuts out the seats for butt hinges in soft or hard doors, jambs, and similar work, which we will send you postpaid for ***75 cents.***

A. W. MILLER MFG. CO.

Main Office and Factory, - - - RIVERSIDE, CALIFORNIA

Eastern Office and Shops, CINCINNATI, OHIO

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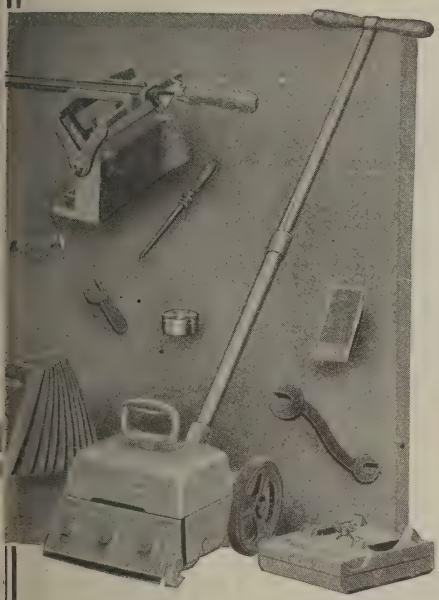
Over $100,000.00 has been saved by users of the

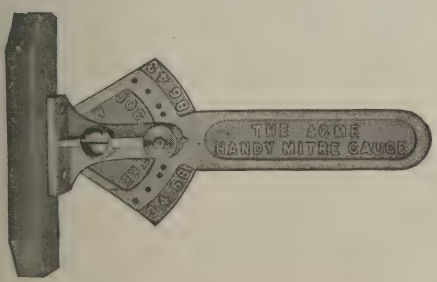


Acme Floor Scraping Outfit

during the past five years. Thousands of machines are now in daily operation, and every mail brings letters from users commenting upon the satisfactory work their outfits are doing and the vast amounts of labor expense they are saving.

Now, Mr. Contractor, you do not have to rely upon what I say regarding the merits of my machines, but I want you to let me send an outfit to you on **one week's free trial,** and you can then let the machines demonstrate on your own work just what they can do. If, after working with the equipment for one week, you are not convinced that the same will save you many dollars, and do your floor scraping better than it was ever done before, just pack up the machines, return them to me, and you will owe me nothing.

Write today for booklet and full details of my proposition.



The Acme Handy Mitre Gauge

is another labor saving tool. It is absolutely accurate, can be set at any angle and fits in the pocket where it is always ready for instant use. If your dealer does not carry them in stock, then write to me for circular describing this wonderful little tool.

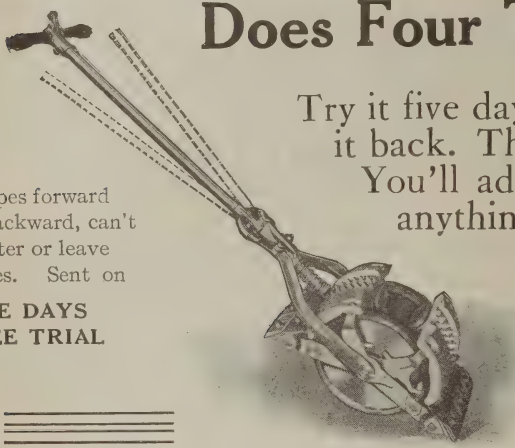
JOSEPH MIOTKE 249 Lake Street, Milwaukee, Wis.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The WEBER DOUBLE ACTING Floor Scraper

Enables you to bid lower on the same profit, or boosts your present profits—because of the great saving in time. It scrapes twelve "squares" a day against three by hand—actually

Does Four Times the Work



Scrapes forward or backward, can't chatter or leave waves. Sent on

FIVE DAYS FREE TRIAL

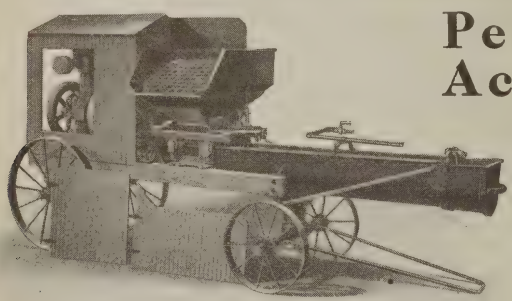
Try it five days. If you don't like it, send it back. The trial won't cost you a cent. You'll admit we couldn't do this with anything but a perfect machine.

JOHN F. WEBER, Pres.

Weber Manufacturing Co.

661 71st Avenue, WEST ALLIS, WIS

Perfectly Mixed In Accurate Proportion



The Wizard Continuous Concrete Mixer Gives You a Perfect Quality of Concrete and at a Low Cost.

And that's where the profits are in the Concrete business. The Wizard Mixer has a capacity of 25 to 65 cubic yards of concrete daily, according to equipment. It does all the work accurately and works continuously. It does all the measuring, every ingredient in perfect proportion. Then mixes them thoroughly in the dry state, then moistens them just as desired, and then mixes them in the wet state. All you need to do is to keep the hoppers filled with sand, gravel and cement, and the Wizard will run 24 hours a day, turning out concrete perfectly proportioned. The machine will actually save enough cement and labor to pay for itself in less than 6 months.

PRICE, $149.75 AND UP.

Ten Days' Trial.

We will ship you the Wizard Mixer on Ten Days' Trial. Use it ten days. Give it a good test, and if it is not satisfactory in every respect, ship it back to us and we will return your money, including all transportation charges. If you keep it; remember Sears, Roebuck and Co.'s guarantee is back of it.

Remarkably Low Prices.

In construction, capacity, efficiency and price, the Wizard Continuous Concrete Mixer has them all beat. Manufacturing them in large quantities and shipping direct from the factory to buyer is the secret of our low prices.

DESCRIPTIVE CIRCULAR MAILED FREE. Send your name and address at once for all our literature about this great machine, sent Free and Postpaid, describing the entire mechanical construction of the Wizard, giving our special low prices and the full details of our liberal Ten Days' Trial Offer. Write today.

SEARS, ROEBUCK AND CO., CHICAGO, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

For Rent

THE TRIPLE "A" SPRING DRIVEN FLOORSMOOTHER

YOU DON'T HAVE TO BUY a machine to enjoy the advantages of one. Nor do you need to place yourself under any obligations by accepting one on "free trial."

We'll Rent you one at a reasonable figure—you simply use the machine and tools as long as you like. Instead of a few days trial we'll give you the option of buying the outfit any time within **30 days** and applying the rental on the purchase price.

We guarantee The Triple "A" Spring Driven to be best floor surfacing machine in the world—it is a Scraper, Sander and Blade Sharpening Machine all-in-one.

Write for particulars of our new rental poposition **now.**

Triple "A" Machine Co.
30 North Clark St.
CHICAGO

TEAR OFF THE COUPON.

Pin coupon to your letter head

Send particulars of your rental proposition and folder describing The Triple "A" Spring Driven.

Name .....

Address .....

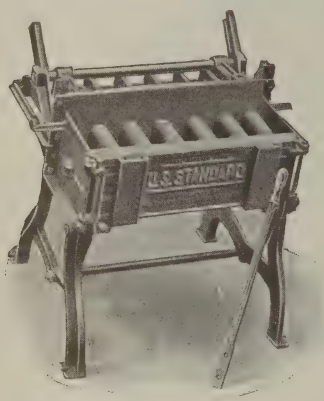
Business.....

Nat'l Bldr., **July, 1912**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

PROFITS

In block making are dependent on the simplicity of the block machine to operate quickly and with a sureness of turning out each block perfect.



Three reasons why the **U. S. Standard Block Machines** make money for contractors and builders:

Simplicity

With its sturdy and simple construction any amateur can operate it with a few hints on the essential points. No clamps, chains, cogs, wheels or springs to get out of order.

Speed

Its simplicity gives greater speed than more complicated machines. We challenge competition.

Strength of Block

The greater number of small cores instead of two large ones give as much air space and more strength. This is why U. S. Standard made blocks are the nearest to perfection.

Send for detailed information on cost of machine and block making.

The Ashland Steel Range & Mfg. Co.
Ashland, Ohio

A Free BOOK

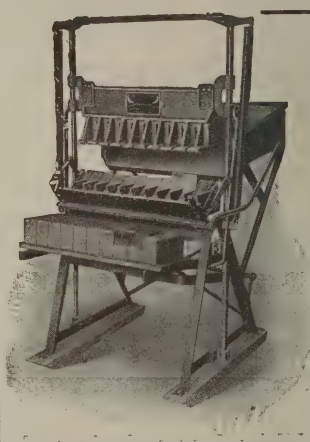
On Concrete Machinery

It isn't exactly a catalogue, because it gives you the cost of making concrete Blocks, Bricks, Porches and Chimneys. It tells all about the profits in making Drain Tile for Farmers, the advantage of drainage, etc.

BUILDING BLOCKS
BRICK
PORCHES
CHIMNEYS
DRAIN TILE
SEWER PIPE
SILO BLOCKS
AND OTHERS

You ought to have this book if you are interested in concrete. Sixty-four pages of illustrations and interesting reading. Send at once, today, a postal will do.

W. E. DUNN MFG. CO.
4135 Fillmore Street **CHICAGO**



MAKE CEMENT BRICK

Our "Crescent" Vertical Tamping Brick Machine will establish a big and profitable business for you. Cement bricks are rapidly replacing clay bricks, also cement blocks, owing to their beauty, durability and low cost of production. You get a handsome price for artistic brick.

Get our Illustrated Catalog and lowest prices. It will be an "eye opener" to you.

It will pay you to act at once.

We also manufacture Continuous Mixers, Sewer Pipe and Tile Molds, Power Tile Machines, etc., etc.

Raber & Lang Mfg. Co.
819 MILL STREET
KENDALLVILLE, IND.

NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NORTHWESTERN

THE BIG LINE OF

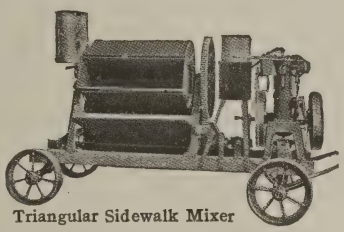
Concrete Machinery

Northwestern prices are from 15% to 50% lower than on any other standard line of concrete machinery, tools and appliances. Everything guaranteed. No money down—10 days' trial. Low prices are the result of big facilities and manufacturing economics. No matter what you need for any kind of CONCRETE WORK, you will find it in the NORTHWESTERN LINE, at a money-saving price.

Get the Catalogs

and see the substantial money-saving on everything you need: machines, moulds, tools or accessories.

Write today for catalog, stating what machine or mould you are interested in.



Triangular Sidewalk Mixer

Northwestern Steel and Iron Works

1090 Spring Street *EAU CLAIRE, WISCONSIN*

Wholesale Prices

Block Machines, $10 to $250; Brick Machines, $22 to $75; Mixers, $24 to $1000; Porch Column and Baluster Outfits, $15 to $75; Cap and Sill Moulds, $12 to $35; Lawn Vases, $15 to $25; Ball Moulds, $2 to $17; Grave Stone Moulds, $7 to $69; Well Curbing Moulds, $4 to $7; Drain and Sewer Tile Moulds, $6 to $83; Block Cars, $11 to $17; Fence Post Moulds, $7 to $12; Silo Moulds, $14 to $150; Coping Moulds, $18; Hitching Post Moulds, $20; Baluster Moulds, $6 to $18; Jardinieres, $12; Special Gate Post Moulds, $10 to $30; Newel Post Moulds, $14; Grave Markers, $7; Burial Vaults, $90.

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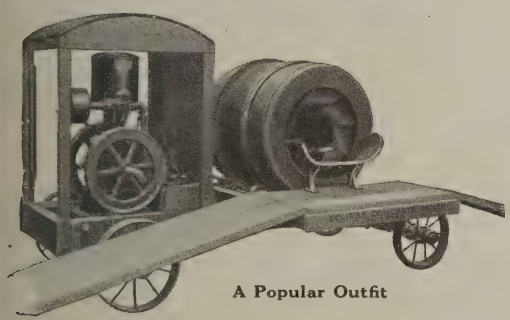

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NAT. BUILDER

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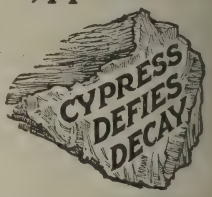

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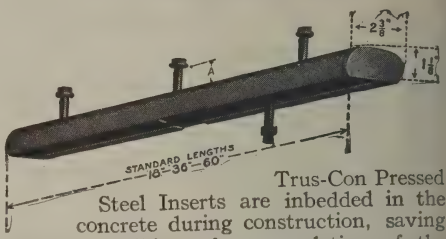

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The NATIONAL BUILDER

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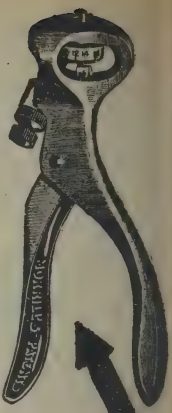

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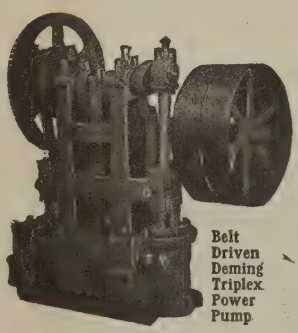

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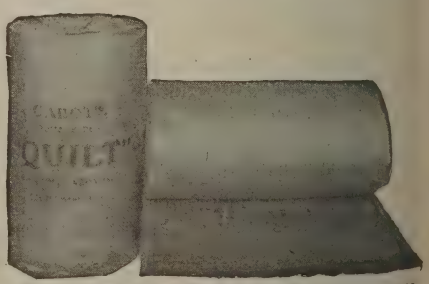

Photograph of New Rolls of Quilt. Note narrow space in middle for splitting into 18" strips.

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THE NATIONAL BUILDER

Vol. 54 (48th Year) CHICAGO, JULY, 1912 No. 3

A Cottage at Hempstead, N. Y.

By W. F. McCULLOCH, Architect

EVERYONE starting to plan a house has in mind making it a model one. Whether for himself or for a client, the architect is especially interested in preparing a plan which shall meet the present needs, yet properly provide for such alterations and additions as family require, and fortune permits. When such a house is built it serves as the architect's standard of home, not as regards expense, but for comfort, and the more people admire the plan, arrangement and the perspective, the better he can feel that his task has been successfully performed.

The best reason for considering this a model house is that it was planned, and built as near as we could plan, to meet our needs, and we find that after occupying it for eighteen months it meets those needs and that we are completely satisfied with it. Except for a few small additions in equipment which we felt we could not afford, we cannot see where we can improve on it.

The abstract of our requirements was briefly this: We must have a cellar, kitchen, pantry, dining room, living room, den and four good bed rooms. We also wanted an attic that could eventually be partitioned off into rooms if desired. All these rooms must be so planned as to give us the best arrangement and largest spaces compatible with good construction and finish, and with the least possible expenditure of money.

After having exhausted every resource with combinations of rooms, upstairs and down, without having reached any satisfactory solution, we started with the second floor and drew a box with bedrooms in each corner and closets between them, and a hall and bath room in the center. Next a bedroom was planned out, making it only as large as was thought necessary, and then the bath room, of minimum width, was laid out. This was then drawn to scale, after which we started on the first floor plan to see what could be done there and, as everyone can see from looking at the plan, the first floor took care of itself without any particular effort except as to the minor details. The one story pantry extension naturally suggested itself and the rear door of the hall did not require any great depth of thought.

The question of access to the front door and to the second floor from the pantry without passing through the dining room was next considered and was finally worked out by putting two doors between the kitchen and hall under the stair landing. We considered a separate back stair as an absolute luxury and the combination back and main stair as an attempt to get a show of something that we really would not get. You will note that the kitchen is shut off from the rest of the house by two doors at each exit.

The arrangement and equipment of the kitchen was next considered and here my sister reigned supreme. She decided that the most important thing in the arrangement of a kitchen was to have each fixture within easy reach of a central table and to have the sink and range as near the pantry as possible. When we arrived at that conclusion we simply arranged the fixtures to obtain that result, which has proved entirely satisfactory. The tubs are covered with a good substantial well fitted wood cover that can be entirely removed, and during six days of the week this serves as an auxiliary table.

By giving the refrigerator a little thought it was found possible to fit it with a door for outside icing, so that one less tradesman had an excuse for entering the well kept kitchen. A further saving is effected in the ice bill by having the refrigerator fit the space and being of ample capacity.

Over the sink, gas range and over the tubs we built into the wall three closets 4 inches deep, 12 inches wide and 24 inches

Cottage at Hempstead, N. Y. W. F. McCulloch, Architect.

high with two shelves each and these are used for the storage of laundry supplies, matches and such small odds and ends as are constantly used in the kitchen. We also placed similar closets in each bedroom and in the bath.

The matter of three open fire places taxed our ingenuity to find an excuse sufficient to warrant them. We are sure they would make excellent ventilators but they cost money and so many fire places in such a small house seemed unreasonable. Finally we had a happy thought. If they afforded ventilation we could afford to make the height of the stories unusually low and more home like and that of course saved expense and enough to build the fire places, provided we could arrange the matter of the cost of mantels. This we did by ordering three extra lengths of the door and window architrave and the facia and shelf were made up of stray pieces of base and odd mouldings. It took a carpenter about a day to make and put up a mantel. The facings and hearths were made from ordinary face brick.

Estimate of Hempstead Cottage*

By I. P. HICKS

EXCAVATING AND MASONRY.

235 yds. plastering, 35c	$ 82.25
890 ft. concrete floor, 7c	62.30
1,100 cu. ft. concrete wall, 25c	275.00
50 lin. ft. chimney breast, $2.50	125.00
48 lin. ft. chimney above breast, $2	96.00
Total excavating and masonry	$640.55

LUMBER BILL.

	Feet.
10 2x10x20 ft. girders	330
1 4x8x18 ft. girders	48
44 2x8x14 ft. first floor joists	836
12 2x8x16 ft. first floor joists	252
8 2x8x12 ft. first floor joists	128
11 4x6x16 ft. sill plates	352
44 2x8x14 ft. second floor joists	836
12 2x8x16 ft. second floor joists	252
44 2x8x14 ft. attic floor joists	836
12 2x8x16 ft. attic floor joists	252
24 2x4x10 ft. attic collar beams	156
8 2x4x12 ft. ceiling joists	64
10 2x4x14 ft. rafters to rear part	90
136 2x4x18 ft. outside studs	1,632
46 2x4x18 ft. partition studs	552
38 2x4x16 ft. partition studs	968
30 2x4x10 ft. gable studs	195
10 2x4x16 ft. dormer	110
54 2x4x16 ft. plates	594
36 2x6x18 ft. rafters	648
6 2x6x16 ft. porch	96
26 2x6x10 ft. porch	260
30 2x4x10 ft. porch	195
20 2x4x18 ft. porch	240
30 1x4x12 ft. bridging	120
30 1x6x12 ft. braces	180
10 2x6x16 ft. partition	110
Total ft. framing lumber	10,332
10,332 ft. framing lumber at $26	$268.63
2,800 ft. No. 2, 10-in. sheathing outside walls, $26	72.80
28 shingles outside walls, $4	112.00
1,250 ft. 1x8 No. 2 Y. P. lap rough floor, $26	32.50
1,800 ft. 1x6 No. 2 roof sheathing, $26	46.80
18 M shingles for roofs, $4	72.00
1,400 ft. 2¼ face Y. P. flg, $40	56.00
1,300 ft. 3¼ face star flg, $32	41.60
1,300 ft. No. 1 com. 4 in. attic, $28	36.40
5 rolls R. R. paper, 50c	2.50
250 lineal ft. 1x10 cypress finish, $45	9.36
180 lineal ft. 1x8 cypress finish, $45	5.40
500 lineal ft. 1x4 cypress finish, $45	7.51
320 ft. 1x4x16 ft. clear Y. P. flg. for porch, $40	12.80
90 ft. 1x4x12 ft. clear Y. P. flg., rear porch, $40	3.60
310 ft. ⅝x4x16 ft. Y. P. ceiling, $32	9.92
50 ft. ⅝x4x12 ft. Y. P. ceiling, $32	1.60
Total lumber bill	$791.42

MILL WORK.

7 cellar window frames, $1.75	$ 12.25
7 cellar sash, 8x10, 3 lb., 80c	5.60
1 cellar door frame, 2 ft. 10 in. by 6 ft. 6 in.	2.40
1 cellar door, 2 ft. 10 in. by 6 ft. 6 in. by 1⅜	2.80
1 front door frame with side lts. and pilasters	16.00
2 rear door frames, 3 ft. 0 in. by 6 ft. 8 in., $3	6.00

*Materials are figured at Omaha prices. Carpenter labor figured at 40 cents an hour.

Cottage at Hempstead, N. Y. Entrance.

1 rear door frame, 2 ft. 0 in. by 6 ft. 8 in.	2.50
4 triple window frames, center window 9x12, 12 lts., sides 9x12, 4 lts. $6.50	26.00
13 window frames, 8x12, 12 lts., $2.25	29.25
2 window frames, 8x10, 12 lts., $2.25	4.50
1 window frame, 8x12, 8 lts	2.00
1 sash frame, 10x10, 6 lts	2.00
1 ice door frame, tran. 8x10, 3 lts	3.00
4 windows, 9x12, 12 lts., $2	8.00
8 windows, 9x12, 4 lts., $1	8.00
13 windows, 8x12, 12 lts., $1.90	24.70
2 windows, 8x10, 12 lts., $1.80	3.60
1 window, 8x12, 8 lts	1.50
1 sash, 10x10, 6 lts	1.40
1 ice box door	3.00
1 set door jambs, 3 ft. 0 in. by 6 ft. 8 in	.80
2 sets door jambs, 5 ft. 0 in. by 7 ft. 6 in., $1	2.00
7 sets door jambs, 2 ft. 8 in. by 6 ft. 8 in., 70c	4.90
8 sets door jambs, 2 ft. 6 in. by 6 ft. 8 in., 70c	5.60
1 set door jambs, 2 ft. 0 in. by 6 ft. 8 in	.60
4 cupboard jambs, 40c	1.60
1 front door	16.00
2 side light sash, $1.50	3.00
2 rear doors, 3 ft. 0 in. by 6 ft. 8 in., $5	10.00
1 inside door, 3 ft. 0 in. by 6 ft. 8 in.	4.50
7 inside doors, 2 ft. 8 in. by 6 ft. 8 in., $2.50	17.50
8 inside doors, 2 ft. 6 in. by 6 ft. 8 in., $2.50	20.00
1 inside door, 2 ft. 0 in. by 6 ft. 8 in.	2.25
360 ft. casing, 12 ft. for windows, 2c	7.20
672 ft. casing, 14 ft. for doors, 2c	13.44
380 ft. head casing, 12 ft., 2c	7.60
380 ft. cap, 2c	7.60
380 ft. cap mold, 1½c	4.70
360 ft. door stop, 1c	3.60
420 ft. window stop, ½c	2.10
130 ft. window stool, 2c	2.60
130 ft. apron, 2c	2.60
670 ft. inside base, 3c	20.10
670 ft. floor mold, ½c	3.35
80 plinth blocks, 6c	4.80
3 thresholds	.45
410 ft. picture mold, 1½c	6.15
4 front porch col., $3.50	14.00
1 rear column	1.50
1 piece porch rail bottom, 6 ft., 6c	.36
1 piece porch rail bottom, 16 ft., 6c	.96
2 pieces porch rail bottom, 10 ft., 6c	1.20
1 piece porch rail top, 6 ft., 6c	.36
1 piece porch rail top, 16 ft., 6c	.96
2 pieces porch rail top, 10 ft., 6c	1.20
160 balusters, 4c	6.40
500 ft. lattice, 60c	3.00
320 ft. 3½ in. crown mold, 2c	6.40
320 ft. 1¼ in. bed mold, 1c	3.20
120 ft. cove mold, 1c	1.20
100 ft. quarter round	.60
3 mantels, $45	135.00
Stairs	60.00
Attic stairs	20.00
Linen closet	8.00
Wall closets	14.00
4 closets, $1.50	6.00
Pantry cabinet	25.00
Total mill work	$649.88

CARPENTER LABOR.

10,332 ft. framing lumber, $10	$103.32
5,850 ft. sheathing, $8	46.80
46 M shingles, $2	92.00
1,400 ft. 2¼ face flg., $20	28.00
Smoothing	19.00
1,300 ft. 3¼ face flg., $15	19.50
Smoothing	15.00
1,300 ft. attic floor	16.00
770 ft. ceiling and porch floor, $15	11.55
192 ft. main cornice, 12c	23.04
100 ft. porch and rear, 12c	12.00
Porch rail and balusters	20.00
Setting frames	12.00
40 per cent cost of mill work for finishing	259.95
Total carpenter labor	$678.16

RECAPITULATION.

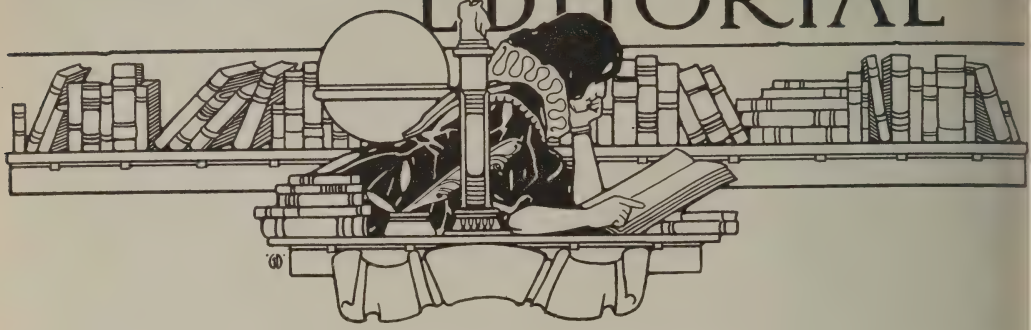
Excavating and masonry	$ 640.55
Lumber bill	791.42
Mill work	649.88
Carpenter labor	678.16
Hardware and nails	55.00
Tin work	30.00
Plastering 850 yds., 28c	238.00
Plumbing	280.00
Electric wiring	55.00
Painting	185.00
Incidentals, 5 per cent	180.15
Total estimate	$3,783.16

The number of cubic feet within the walls of this building is about 31,100, making the cost per cubic foot approximately 12 cents per cubic foot.

Cottage at Hempstead, N. Y.

Hall and Dining Room.

EDITORIAL



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* * *

The more you can do, the more you are expected to do, and the more you are responsible for, and if you do your duty, the greater will be your reward.

* * *

The new form of the THE NATIONAL BUILDER feels better, looks better, and is better than the blanket form of "Ye Olden Tyme."

* * *

You cannot escape the responsibilities you owe to the job you are working on without some one suffering, so it is up to you to do your work thoroughly, faithfully and promptly.

* * *

Better for handling, better for binding, better for placing on bookshelves, and better for preserving. "Indeed," says an old reader, "the old NATIONAL BUILDER never looked so fresh and gay as it does today, and if it does as much real good in the next generation as it has in the two last, it will have accomplished a great deal for the betterment of contractor, the working builder, the house owner, and for the country at large! Long may it wave, flourish and succeed in its efforts to uplift the builder and his operatives."

* * *

Harmony in the shop, on the building and in every department of work, adds to the efficiency of the workman individually and collectively, and swells the profits of the contractor, a condition that should be welcomed by all right-minded workmen, not because of the fact that it renders it more possible for increased renumeration,—though this should count—but because of its evidence of every man on the job having done his duty.

* * *

Reducing the size of the page does not lessen the amount of reading matter, as we propose giving the same amount each month as we have always done, and while future illustrations may not be produced on as large a scale as formerly, they will be as numerous, and just as useful and practical. Our detail sheet will continue as usual, each sheet being a complete set of working drawings, and worth the price of a year's subscription.

* * *

A healthful friendly feeling existing between yourself and your employers, evidences a progressive spirit, and is proof of the success of the business in which you are employed and a sure index of the permanency of the enterprise in hand. A friendly spirit between employers and employed is a guarantee that both are contented—to a large extent, with the conditions surrounding them, but, in the nature of things, are open to any and all kinds of betterment in methods, wealth, and environments. Good fortune and success invariably accompany harmonious and friendly relations.

* * *

Did you mail us your opinion of THE NATIONAL BUILDER since it changed its dress? Have you matured an opinion regarding the change? If you have not—wake up, "get a move on" and let us know what you think of it; we don't care a great deal whether you bless or curse us, but of course, we prefer a blessing if you think we deserve it, but say something anyway. We are getting letters of all kinds by every mail—and we ex-

pect yours next; and some of the letters we do receive are not altogether complimentary; we don't mind that, however; indeed, we rather like to be scolded a little now and again. It is good for us and keeps us up to the mark. Whereas, if we receive nothing but praise and compliments, we might become afflicted with that worst of editorial troubles---"A Swollen Top-Knot." It will only cost you a two-cent stamp to mail your letter, so, do it now.

* * *

Knowledge is wealth as well as power. The man possessing special and advanced knowledge in any line of business or trade, gets all the plums that fall within his limits. Knowledge is not so difficult to obtain now as it was formerly, as the opportunities for acquiring it are many and easily reached. Every form of education from the primary to that of technical schools and the universities, is available for every one having the right "stuff" in him to make the effort to get there. In the cities and towns which are centers of manufacturing, the demand for scientific training is becoming more general, and as a consequence there is more interest in this training. The manufacturers of this country, indeed, are much more alive to the need of scientific aid than they were years ago. The services of the chemist, for instance, in the iron and other industries are much more in request; and it is within the same period also that many of the great lumber and pulp firms of the country have realized that the forest engineer is an immediate economic helper, as well as a conserver of forest wealth for future generations.

* * *

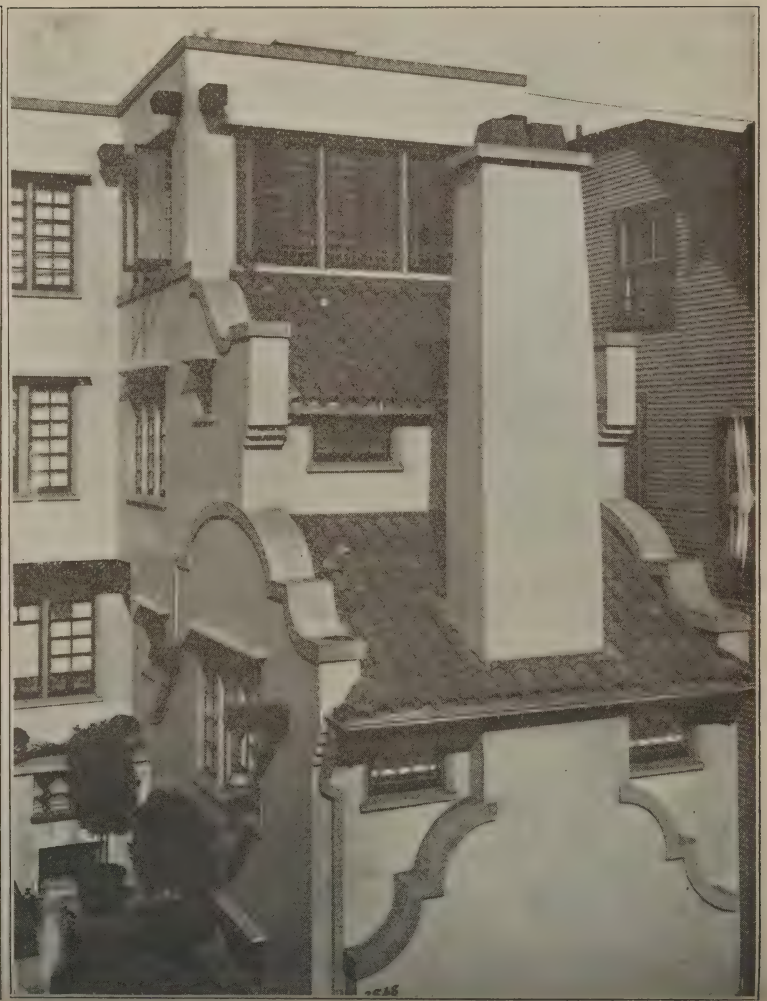
Economic considerations have enhanced the value of scientific education in the manufacturing centers. Economic considerations in agriculture also must soon have weight for the uplift of the rural school, for scientific method is as much needed in agriculture as in manufacturing. The day of mere exploitation of the soil must pass. The wand of science is now an economic necessity. The general occupation of the good soil everywhere in the United States and Canada, together with the advancing prices of farm produce, have brought more and more of the poorer soils under cultivation. With the constant expansion of the cities and towns, and their greatly increasing absolute and relative consumption, the produce of the poorer soils is likely to be more and more in demand.

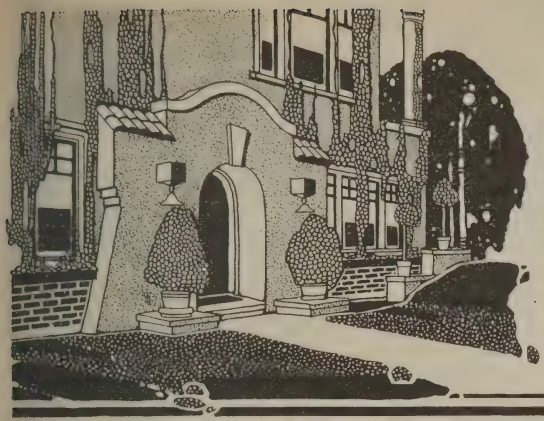
* * *

It may not be out of place, perhaps, to make note of the foundering of the Titanic with sixteen hundred souls on board, a fact which has gone into history as the greatest disaster of ocean traffic in the history of the world. This great ship, the largest in the world, which was thought to be unsinkable, collided with an iceberg and had its bottom ripped open as if it had run on a jagged rock. It was due to the wireless telegraph system that seven hundred of the ship's company were rescued by the Carpathia.

The facts, however, are probably familiar to all our readers. The incident is referred to chiefly to draw attention to the splendid spirit that was displayed by the officers and crew and by most of the passengers in the face of the awful calamity that overtook the vessel. Referring to the loss, in the British House of Commons, the Premier said, "that the best traditions of the English speaking race had been observed by the men aboard the ship, without distinction of station."

The men formed in two lines, and the women and children passed between to take their places in the life boats and have a chance for safety. As in other disasters of ships manned by the same race, women and children were the first care of the officers and crew. Very few men were saved, and among those who were lost were men like C. M. Hays, general manager of the Grand Trunk Railway; John Jacob Astor, a hundred times a millionaire; Editor Stead, and many others of equal importance. The proportion of women and children saved is in itself a proof of the bravery that was displayed by the men on board the ill-fated steamer.





MODERN MISSION APARTMENTS

by Horatio A. Stoll

ONE of the architectural features of the residence section of San Francisco that surprises visitors most is the variety of distinctive hillside homes that are to be seen in practically every section of California's metropolis. Of late years, various architects have attempted to get away from the winding steps that lead up the hilly frontages of steep lots to residences perched 30 or 40 feet above the level of the street. Of these, perhaps the most successful is Henry C. Smith, who has made a specialty of this type of building and has come to be known as the "hillside architect."

A half-dozen of his unique conceptions have been worked out in the form of flats and apartment houses. Perhaps the most striking is his own Mission Flats that run

Hillside Apartments. Henry C. Smith, Architect.

from the sidewalk level up the hilly north side of Sacramento street, near Maple. They are unique, indeed, and represent an outlay of $30,000. The lot is 56x104 feet. However, the building is so arranged about a terraced court that from across the street the lot presents the appearance of being at least 20 feet wider than it really is. The exterior walls are finished in klinker brick and cement, with redwood beams and cornices left natural. The irregular roof is of bright red tile.

The largest flat, occupied by Mr. Smith and his family, contains 14 rooms. The others have 9, 8, 6 and 5 rooms, respectively. Each flat has its separate mission entrance handled in an individual manner. Heavy oak doors, ornamented with immense iron hinges and knockers, open into the reception halls and living rooms, with large inglenook fireplaces and high backs built in. The ceilings are heavily beamed and the woodwork is beautifully stained a rich, dark brown. Not a bit of moulding is used in the entire building and the millwork was all made on a circular saw and left perfectly square and plain.

The most typical room in the flats—in fact, the only one in which any real attempt has been made to carry out the mission idea in the interior—is the architect's den or library. It is diagonally beamed and contains a big open cobblestone fireplace that would prove a delight to any man who enjoys a cozy lounging place where he can toast his feet in luxurious ease, or read to the rhythm of the crackling fire. Bookcases and seats are built in the wall and four mission bell chandeliers, especially designed, shed a soft radiance at night. Heavy mission furniture, which is usually better suited to halls or clubrooms, is distributed about the room. The long, straight lines and the rich leather upholstery add not a little to the "atmosphere" of the den.

In planning the arrangement of his flats, Mr. Smith constantly kept in mind the necessity of plenty of light and sunshine in every room. The outlook from the windows overlooking the court is dazzling on a sunshiny day, for the cream-plastered walls reflect the sunlight wonderfully.

The court is charming. It is laid out in terraces, the first being a flat lawn, dotted along the edge with klinker brick pots holding palms. The second is a sloping lawn running up to a cement wall that is draped in nasturtium vines, while the third is a

Hillside Apartments. Main Entrance.

circular center garden filled with flaming red geraniums. Formal looking bay trees, palms in terra cotta pots and an abundance of flower boxes overflowing with red geraniums and trailing vines complete the floral decorations. The walks are paved in large square tiles of a rich dark brown.

Altogether, Mr. Smith's Mission Flats are decidedly original in conception and differ materially in construction from any hillside building I have seen in any other city in the United States.

Sliding Doors

By AUGUST C. SCHNAKE

THE phrase, "sliding door," in the sense that we generally use it, is a misnomer, inasmuch as a sliding door is not a sliding door, but a "rolling door." How the term originated I am not able to say. Perhaps in times gone by when people were not so fortunate as to have the fixtures for this purpose as we now have them, they conceived the idea of shoving the door inside or along the outside of the wall to be out of the way, and as they had no rollers to roll it on, they simply slid it along on the floor, and there is your sliding door for sure. But, whether this conjecture is right or wrong matters little or nothing, as that was not what I wanted to write about anyway. What I have in mind to discuss is the proper installation of the present-day so-called sliding door. There are two kinds; those having rollers on the bottom and sliding on a track on the floor, and those having the rollers on top and rolling on a suspended track, hanging clear of the floor. These are again divided into two classes, the single and the double door.

The first mentioned kind, having the rollers and track on the bottom, are found mostly in more or less older buildings, and are somewhat out of date and have given way to the newer kind, a bad feature being the necessity of putting the track along the floor all through the opening, making a very unsightly job, also the fact that the wheels or rollers would wear with considerable usage on the bearings until the door would drag on the track. I was called upon sometime ago to look into the antics of one of these old-timers. It would neither roll nor slide, but when coaxed very strongly would jump up and down like a scared broncho. After a thorough investigation I diagnosed the case old age. It was either get new fixtures or quit sliding.

Since we have not decided that the door with rollers and track on the bothom is out of date, we will pass it up and take for our consideration the sliding door that rolls on the top.

A sliding door properly installed is a thing of beauty and a source of satisfaction and convenience for all time, and if crudely or improperly constructed, it is the most unsatisfactory, the most aggravating and disagreeable, the greatest nuisance and the worst temper and religion tester ever conceived. Nothing grates on the nerves worse than a sliding door dragging part or all the way, producing a sound like squealing and grunting in a high pitch, and with the strength of a fog horn. Also, if not properly constructed it will serve as an abode for mice or it may serve as an inlet of cold air in winter time, and become a nuisance in that way, so we see there are several things to consider when we put in a sliding door if we would please our customers, and a carpenter who is in the habit of doing his work in a slip-slod way has no business putting in a sliding door.

Now, I would advance the remark that this article, like most others that we read in our trade papers, is intended for the beginner or those of lesser experience, and while the expert might find things to criticise, it is actual experience I am propounding and not merely theory as we sometimes get it, which will not work out when it comes to the actual test.

Of the two kinds, single and double doors, I prefer the single and advocate its use if the space will permit, because there is less chance for complications on account of doors warping, building settling, or some discrepancy in the fixtures. I have hung doors as wide as eight feet, single, which never gave trouble, while I have had all kinds of

trouble with double doors not more than two feet each.

Ordinarily sliding doors are 1⅜ inches thick; if thicker it merely takes up wide space between walls, otherwise it doesn't change the general construction a particle.

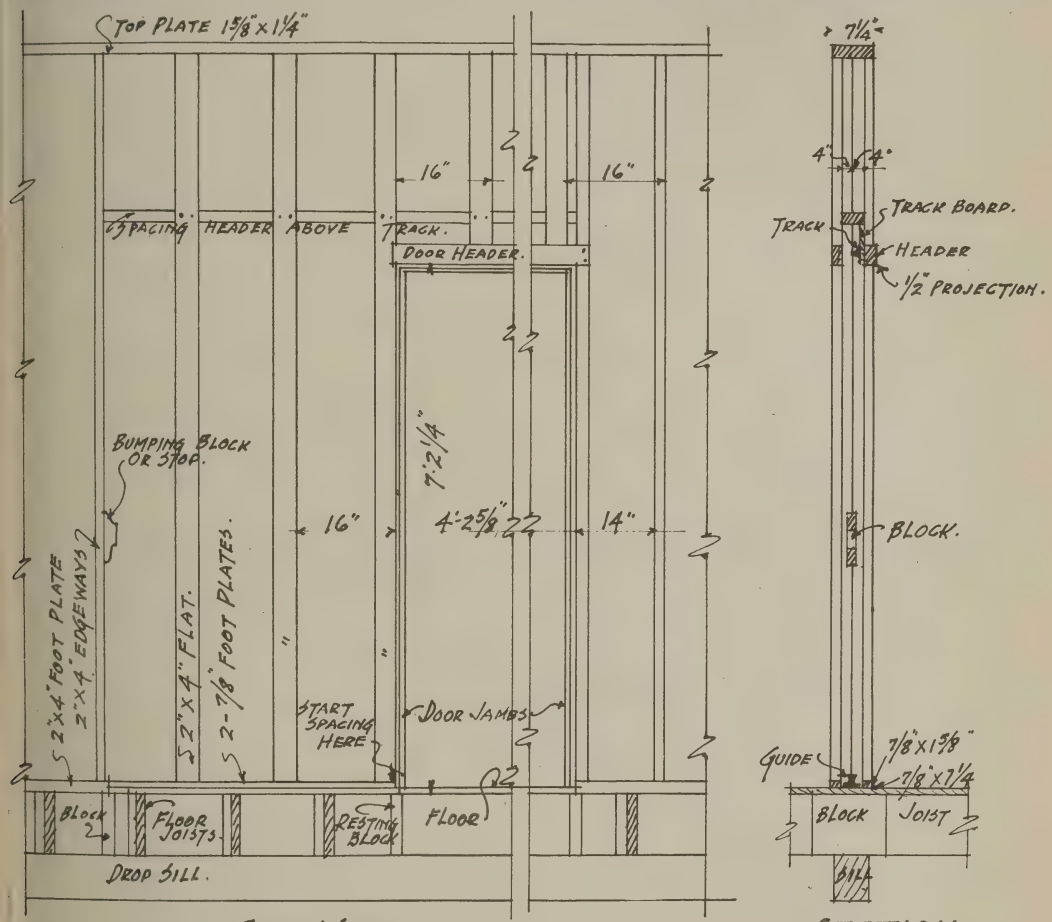
The first thing to consider is the floor where our partition is to set on. If it is a non-bearing partition, that is, if the second floor or ceiling joists don't rest on it, and it can be set after the floor is laid, or where we have a sub-floor which is laid before any partitions are set, we have a good bottom and can go ahead. But sometimes we come up against a proposition like this: We have a drop sill, the floor joists are framed over it; we have no sub-floor; our partition is a joist-bearing one; we shall not lay floor until after plastering; we want to economize on wall space and set our studding flatways; we want an air and mouse tight job (see drawing). What can we do? Let us figure a little.

We have a 4′ 10x7′ 10x1⅜ inch door. Let us see how much space we need: 1⅜ inches for door, 1 inch for stops on door, 1⅝ inches for clearance—that is plenty, but the fixture manufacturer wants 4 inches clear space, which will permit a 2-inch door, and have plenty of room. Now we have 4 inches; our studding are 2-1⅝ inches or 3¼ inches, and 4 inches makes in all 7¼ inches from outside to outside, or just as much as two 2x4 inches set together edgeways. Now, this is the way I do it. For the bottom I take a 12-inch lining board, picking out a pretty good one, and rip it up to 7¼ inches, and as long as the door is wide—in this case 4 feet—the ripping off this board will give me two 1⅝-inch pieces, which I tack on top on each edge, and locating my starting point, nail my board on the joists, being sure to get my face line right with the continuing wall if it does like in a hall if the joists do not come right for the ends, nail a 2-inch resting block under each end of your board, catching it half. Let the other half of thickness extend to catch the floor or the continuing wall, as the case may be. For foot plates under the balance of partition, either the continuance of this wall or the other side of door, I simply put down two 2x4-inch tight together and I have my foot plates, by nailing the 1⅝x⅞-inch rippings on my 7¼-inch board, brings that part flush with the 2x4-inch plate (see drawing), and I can use same length studding. For the top plate I take a 2x8-inch and rip it to 7¼ inches, and as long as room is wide, or where the double partition terminates, and I have a mouse and air-tight bottom and top.

We will assume we are using single hangers and track. The track, being fastened with brackets riveted on to the track bar, requires a track board in the wall, and so we will have to set up our partition one side at a time. Which side we put up first is immaterial, as the track when properly put up will be in the center of our opening, and the hangers will work either way.

The next thing now is to get the width of our framed opening. We will see our door is 4 feet; our jambs are 13/16 inch or 1⅝ inches for both. We will have to allow a little room for wedging to get our jambs straight and plumb. As the chances are that our studding are not exactly straight, we will allow ½ inch on each side, or 1 inch for both sides. Now, we have 4 feet 2⅝ inches, which is the distance between studding. We will now nail down our foot plates as described above, and space them off on 16 inches for lath. It is a good plan to start spacing on one of the sides of the door opening, preferably where the door slides, and carry the spacing across the door opening, so the lath will space right over the top. In this case it will make the first space on the other side of the door from where we start a little less than 16 inches, but since some of the lath will have to be cut anyway, it does not make as much difference, as to get the top space all out of kilter. Now, we mark our top plate by the bottom, and we are ready to look after our studding. After cutting the required amount to right length, we pick out eight of the straightest, as we want to use them for our door. It will be necessary to notch three of these on the flat side ½ inch deep, and say 6 inches wide, to receive the track board. This is necessary so as to bring our track in the center of open space, otherwise we will have one jamb wider than the other one, which does not look right to say the least. Now, we will have to figure a little to get the right height for our gains. There is for floor, ⅞ foot; clearance under door, ⅜ inch; door, 7 feet; as our door comes under head jamb, we will allow 1 inch, giving a total of 7 feet 2¼ inches; as we have

figured from the joist, we must deduct for our footplates, which are 1⅝ inches, leaving us 7 feet ⅝ inch to bottom of notch. After they are notched, we will nail all the studding needed on one side to plate, raise it up plumb and brace both ways. Now, the dressed edge. This will serve us as a guide line to get our track straight. Now, take an 8-foot piece of track and examine it carefully to see that it is perfectly straight on the top edge, which is the one that shows a margin above the brackets that are riveted



've come to the most important part of the whole undertaking; that is, the track board and track. We will pick out a 1x6-inch good material, without any short curves or twist, and cut to 8 feet 2½ inches long, dress one edge perfectly straight and pretty well square, and scribe a line 3 inches from on, to give clearance for flange of the roller. If there are any humps, get them out by laying it on a straight, solid block or stone, and use a heavy hammer until the desired result is obtained. It is very important that this be done, as will be explained later. Now lay the track with brackets down on

the board and see that all brackets rest flat and even, and the track bar is just 1½ inches from board. It is essential to do this as any variation here will affect the smooth working of the door. Tracks are generally wired into a bundle and shipped without any protection, and sometimes the brackets are mashed perfectly flat and look like a short cross bar. After the deficiencies are all corrected, lay the track down on the board; hold your try-square on the board on your scribed line; shove the top edge of track against the blade of square and proceed to put in screws. A good plan is to first fasten the ends, then the center and so on, always using the square as you go along; first fastening the top, then measure up and if it is not right, it can be helped a little in spreading or narrowing the brackets, but do not get away from the line. When all done, put the board in the gains, tack it and try your level; get it just right, then mark the studding on the other side of door opening on the bottom edge of the board, take out your board and notch the studding to receive header over opening. Remember the board is gained in ½ inch, so instead of gaining out 1⅝ inches, take out only 1⅛ inches; on the other side where track board is gained in—that is, the studding standing flatways—gain out a 1-inch or so just to form a bearing for the header, and nail the header in, letting it project ½ inch, which does not matter, as the head casing covers this and we will have to furr up about ¼ inch to come even with plaster. Now, put your track board in and fasten good; the track board and header should be flush on bottom edge. There is one thing we must remember, and that is the track is the most particular part in a sliding door outfit. If it is right, all the other parts can be adjusted; if it is not just right, it will throw all the rest out of order. No door can ever work perfectly if the track is not straight and even both ways. It is just like the main spring in a clock; if it is good, all the other mechanism can be regulated, but if it is not, the most accurate works will not keep time. The unevenness in track works special havoc with a double door, since to make a good job the doors must both hang plumb or be in vertical alignment when they meet and show right on the back edge along the stop. Now, if there is a variation in the track, the chances are that when the doors are shoved back, the front edge will be at variance with the stop and no amount of adjusting in the hanger will correct it, as it will show either when the door is open or when it is closed. I have seen where the moving of a door 2 inches one way or the other would throw them ¾ inch apart at bottom or top.

Before we are ready now to put up the rest of our partition, there are two or more things to do; the first is, we must put a header, or whatever we are a mind to call it, along above the track, which is for the purpose of keeping our walls straight, and the right distance apart, which is 4 inches, so we take a 2x4, which is perfectly straight, edgeways, the length of the track board and nail some lath or other ⅜-inch strip on to it, and fasten it against our studding high enough above the track to give clearance for the rollers, preferably 4 inches, and we must spike our studding against that thoroughly on both sides. The other thing we must provide is a stop in the wall where our door bumps against, otherwise it might run away or jump off the track, which would make a nice muss. It is a good idea, though, to set this stop back far enough so that we are sure that the door can go back as far as we want it to. If we find it is back too far we can nail a little block on the edge of the door to make it come just right. If we get it too close, we will have to notch the door and botch the job. The stop should be up about half the height of the door.

That reminds me of an incident that happened in this town not a generation ago. A "would be" carpenter built a house for himself and, of course, put in a sliding door partition. When the house was ready for the finish, he was working at something else and got a mechanic to put in the trim, so when he got to the sliding door he put on the rollers and shoved it into the wall. The thing liked to never stopped running. Come to find out there was no stop in the wall. When the proprietor was consulted about this, he said: "I can fix dat alrite," and he did; he went and got him a ¾-inch bolt of the required length with two big washers, bored a hole through the wall and put his bolt in. It was a stop all right, but a h—— of a looking job.

Now, we will put up our other studding

Put in our header, as on the other side, only we put this flush. We want to be careful to get our opening in exact alignment with the other side. Put in our cripples over the door. Put on ¾-inch plaster grounds around the opening and along the floor, and we are ready for the plasterer. We will take a long vacation until this worthy gentleman gets out of our way.

After the plaster is perfectly dry and the floor laid, we assume we have our door and the other necessary material on hand, and we will proceed to hang and finish the door. First, we will clean out the mortar that may have dropped inside the wall, get it out nice and clean, then take our door and lay it on a pair of trestles, which we have covered with clean building paper to keep from marring it; look the edges over to see if any nails have been left in the wood; get our astragal, which is a piece of board about 1¼ inches thick, and in this case 2⅛ inches wide, with a groove in the center the thickness of the door, and molded on the edges the same pattern as the window stop. Now, measure the thickness of remaining wood where it is grooved; measure the stiles of door, and from the front stile we rip off enough, so that when our astragal is fastened on, the front stile is just as wide as the back one; dress the edge straight and perfectly square; cut off the projecting ends and measure from top edge, and if the door is perceptibly longer than 7 feet, rip off the surplus and smooth up. Now, we will measure our guide, which is a short piece of iron 5/16 inch thick, ¾ inch high and about 1½ inches long with a flange on each side, at opposite ends having a counter-sunk screw-hole. Now, get the plow or grooving plane with a ⅜-inch bit, which will give just enough clearance to run nicely. (If we take a wider blade the door will wobble.) Set the guard or fence ½ inch from blade, and proceed to plow the bottom about ⅝ inch deep, working from one edge only to avoid any variation, and nail on the astragal. Take a chisel and continue the groove, leaving about ⅛ inch wood on the face, leaving the guide invisible when the door is in place.

Now, we take our hanger plates and mark for screw-holes and hanging rod, being sure to get the latter in the center of the door, and about 6 inches or 7 inches from either edge, using a bit just the size of the rod. If the hole is larger, the door has a tendency to wobble. The hole should be deep enough to allow for proper adjustment.

Now, fasten the plates with screws, run the nuts down to the end, slip on to the plates and screw down to approximately the right distance. Then take a window-stop and nail along back edge, measuring to show same margin stile. We have one front. Now cope a piece between the top ends and fasten. Clean off all marks and stains with planes and sandpaper, and we are ready to start the door on its rolling journey.

To get the rollers on to the track, it is necessary that we enter the door from the opposite side to which our track is fastened, as the flange of rollers has to be hooked over the track, since the distance between the flange and the hanger rod is less than the depth of the track bar. This is done to keep the door from jumping the track when it bumps, so we will have to bring the door up kind of slanting, and it is probably necessary to notch the header to admit the hangers. This can be done by marking the distance and taking out just the width of rollers. After it is entered, it must be adjusted to height—⅜ inch is a good distance to be from the floor. Try for plumb, open and close, and when right, try if your stop in wall is just right or how much will have to be nailed to door. To get this, we must find out where the front edge will be when jambs are set, and the stops are on. In framing the opening, we allow 1 5/16 inches for jamb and wedging, so we will take that as our starting point, marking on the floor (see drawing). With the front edge of door on this mark, we lay off the back edge. Now, measure your door stop for thickness and mark back whatever that amounts to. This last mark will be the front edge of the door when open. Now, set the iron guide, which should stand in the center between walls and about 3/16 inch back from front edge of door, when open. Shove door shut as far as possible and swing to one side, fasten guide with one screw just barely tight. Let door come back. Slip over guide, and run back and forth several times. This will adjust the guide to door. Now fasten good. We are ready for jambs, which we will make ourselves. The front or stocking jamb is one piece, full width, which is 8¾ inch. Saw to length to ground, header and mark

at top of door, gain the end (with exception of ¾ inch in center) ⅜ inch deep and out to end. The back side jambs are each half of width of front jamb, minus half thickness of door, and ¼ inch for clearance, which is 1 5/16 inches, leaving jambs 3 1/16 inch. The head jambs are each ⅜ inch less than half width of front jamb, or 4 inches. It is a good plan to rabbet the head jambs about ¼ inch deep and ½ inch wide for iron plates on top, for which we will have to allow on our astragal, which should be trimmed to fit this channel, as also in gaining the front jamb or we will have an ugly hole up there. After gaining back jambs the same height and depth as front, cut head jambs just 4 feet ¾ inch long, nail jambs together and put them in. Pull the door to your 1 5/16-inch mark and block jamb to it, now the top and two times between. In back the top will give you the right space, block all the way down, better open the door and with a piece of door stop, try if the front edge comes flush, which it should. In case of variation equalize the difference, keep outside edge flush with plastered wall. Try the top and adjust it, better block and nail in center, being careful not to let door rub anywhere, for it may get worse. Now, put in your lock, as near 3 feet from floor to top as will work out, depending on the door, but whatever you do, get your escutcheon in center of either rail or panel. Sink neither lock nor jamb plate below surface, just flush in right, mark jamb for plate, holding door on center of jamb, if it will go without forcing, but if it should be in the wind a little and not go to the center without pushing it is better to leave it off a little, or it will strike against the stop every time it is closed. When the plate is in and the door locks properly, put on the stops, not too close, or there will be trouble. Tack the back stops temporarily, open the door and see if the front edge conforms with them. If it strikes, give it room, that is all that can be done. Put on the trim and we are done. If instructions have been carried out, we have a job that is a daisy.

One thing that people should be educated to is, where there is no heating plant, there is an uneven temperature in adjoining rooms having a sliding door between them. Never leave the door partly open in cold weather; if they do it is bound to draw towards the heat and give trouble a plenty. It should be either open all the way or tightly closed.

While the general construction of sliding doors with this style hangers is about the same, yet there are some things to be considered; one thing is, in wider openings we will have to use stronger headers, 2x6 inches or 2x8 inches doubled, set on edge, and where there is an extra heavy weight to carry it may be policy to truss over the opening, doubling the first studding up to header. In a case like that it is proper to set the studding edgeways on both sides and not on one side only, as I have seen it done. It looks abominable to see a 5-inch jamb on one side and a 3-inch jamb on the other.

In double doors, the wall has to be framed hollow on both sides of the opening, the required depth just as the one described above, a center stop has also to be provided to let the door go only so far, and when both doors are closed and locked they must be stationary and show the same along the stop on both sides. For this some use an iron stop, which fastens on the track with a set screw and is movable to any place. Others use a block, which is fitted between the head jamb and is made in the following manner: Take a board, any desired thickness, as long as the two hanger rods are apart, when the doors are together, and about 4 inches inside, or wide enough to let the head stops cover the joints, cut the ends on a bevel, except in center, where the rod strikes it, cut out the head jambs to receive the block, make tight the joint on the ends (the sides do not matter as they are covered up), put a screw in each corner and you have it.

On the double door we must also have a double astragal, these are two astragals, one for each door and are matched on the face about ⅛ inch or 3/16 inch deep, so that when the doors are closed, there is no open crack in case the edges are not jointed perfactly. In the very best work the inside of the wall and the back ends are boxed with ceiling, or other suitable material, up to the track board on one side and the spacing header on the other side, which makes an absolutely tight job.

Other difficulties may arise in the course of such work, but the intelligent mechanic will be able to overcome them.

Roofing with the Steel Square in England; Combined Hip, Valley and Gable Roof Intersecting

By J. H. B.

THE cutting-in of the valley rafters, if such were used for the roof now under consideration, would be very similar to the cutting of the hip rafters, the angles and the lengths being the same, but with the sleeper boards this is somewhat altered, the lengths from extreme point to point being the same as for the valleys, but the angles are different. To obtain the correct cuts, one of the valley sections is shown developed in Figure 156, with the position of the short rafters marked on the board at one side. This gives the angle at the top and also at the bottom on the flat side of the board. The top cut will be at right angles to the board to fit against the ridge, but the bottom cut will come to the angle shown in Figure 157; thus the sleeper board, when marked for cutting off, will be as Figure 158. At first sight one would imagine that these boards would require cutting to an angle edgeways to fit against the ridge, but it is not so; the section when they are fixed will be as Figure 159, where *a* is the rafter of the main roof, *b* the ridge of intersecting roof, and *c* the two sleeper boards.

The purlins may either be mitred at the angles, or the side ones may run through and the ends lie on them, being cut to fit with a bird's-mouth joint. The former is the correct way, though the latter may be somewhat easier to do. The two (side and end) purlins, with a mitred joint, are shown in plan in Figure 160, the dotted lines being the part cut away to fit the hip rafter. Figure 161 shows the purlin sectionally as it should be in the roof, though sometimes, especially in the north of England, they are placed vertically. If the latter method is used, square cuts only are required, and the two may be tenoned together; but with the purlin at right angles with the slope of the roof, bevel cuts will be required. The method of obtaining these having already been given, it is necessary only to show the correct cuts for this particular roof, as Figure 162 for the side cut, and Figure 163 for the edge cut.

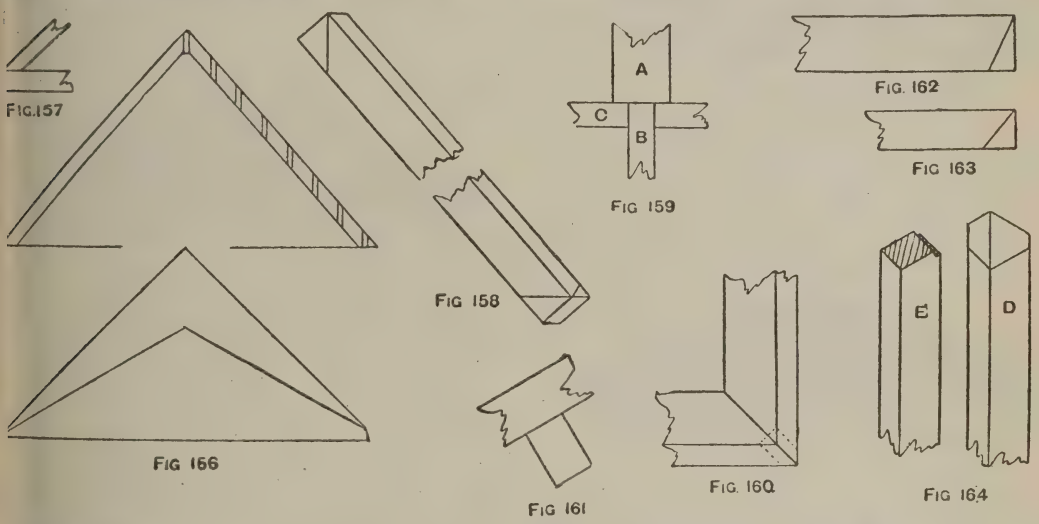


FIG. 157
FIG 156
FIG 158
FIG 159
FIG. 160
FIG 161
FIG. 162
FIG 163
FIG 164

The depth of the notch in the purlins to take the hip rafter will be equal to the width of the latter, minus the length of the side cut on the short rafters; the width of the hip to be taken vertically when it is in position. Figure 164 shows one purlin marked (at *d*) with the notch cut (at *e*). Each notch, or rather the notch in each purlin, must be equal to half the thickness of the hip rafter, so that when the purlins are fixed they will not only fit closely together, but will also clip the hip tightly between them.

Purlins should be used in the largest in-

tersecting roof, and these should be kept at the same height as those in the main roof, fitting them to these with a bird's-mouth joint. At the gable end, of course, they will fix in the wall. Unless framed trusses are used the purlins will require intermediate support at intervals; this will be supplied by means of struts, which should take a bearing on binders fixed on the ceiling-joists, and over partition walls. In the event of these latter being carried up into the roof, as they should be, the purlins will be supported by them.

If valley rafters were used instead of

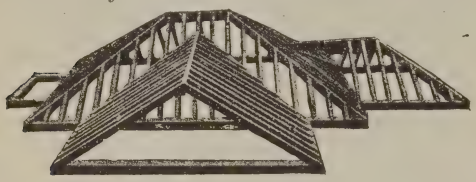


Fig. 165.—Photograph of Roof Finished Except Small Gable.

sleeper boards, it would still be best for the purlins to run through, unless there was some special reason why the could not do so, as they would then add greatly to the strength of the roof. As the valley rafters

Fig. 166.—Same as Fig. 165 But From Another Point of View.

would project below the ordinary rafters, the top edge would require cutting away in a similar manner to the notches for the hip, with the exception that these latter come at the ends, and the former would not do so; otherwise the notches will be the same as regards angles and depths, while the position as regards length will be found from

Fig. 167.—Roof Finished.

the drawing. The short rafters likewise, which come to the valley rafters, will differ from those which fit on the sleeper boards, in that the one is shortest at the upper side and the other is the longest at that part. Bevels will be similar, but reversed.

The photographs, Figures 165 to 168, show

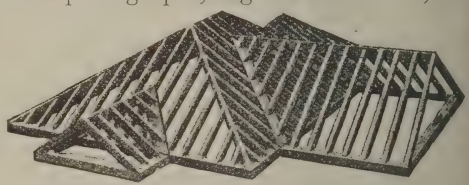


Fig. 168.—Finished Roof from Another Point of View.

the roof in two further stages, from two different points of view, the last two showing it finished with the exception of the purlins, which it was not thought worth while to put in.

This brings the series to a conclusion, and while it is only claimed that the subject of roofing by the aid of the steel square has been but lightly touched upon, these articles should be sufficient to give anyone a start, which can be followed up considerably further with advantage.

Small Contractor and His Personal Appearance

By THOS J. WADDELL

I SPEAK from years of experience when I say that with twenty men or less, it is certainly the proper thing to stay on the job. Put on your overalls and show your men what is expected in a day's work. When you are not with them, they are liable to run out of material, not know what comes next, etc.

From a financial standpoint overalls are all right in their place. If necessary, wear them on the street or in the bank if business takes you there during working hours. Look clean and respectable though, at all times, as a matter of personal pride.

A man should not wear his work clothes in his home. It is well to look and live prosperous, if you are. A prosperous contractor has a good business, and the busy man gets the jobs as lack of work always suggests incompetency.

Another idea in regard to success is, pay your men every Saturday night. They will work better for it than if they are in doubt as to when they will receive their pay.

A Low Cost Cottage

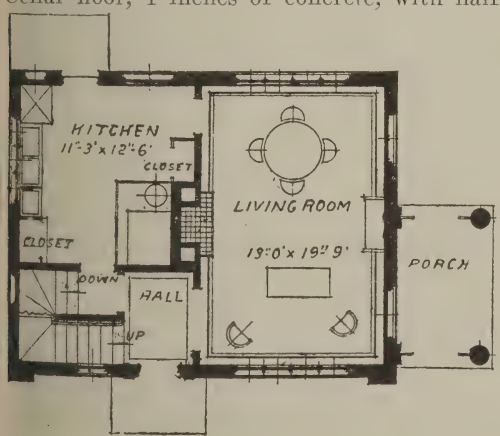
THE plans and details given here are of the house to which second prize was awarded in the $2,500 class in the recent architectural competition of the Building Trades Employers' Association of New York. This does not include plumbing fixtures nor

heating plant, though they are provided for in the plans. These plans are by C. Mink and L. A. Carson, and call for an outlay of exactly $2,500.

The specifications are as follows:

Excavating and grading—Excavate under house proper to a depth of 7 feet, 6 inches, and to sufficient depth to lay side porch floor. All necessary grading to finish grade lines to be done at completion of work.

Mason work—Foundation walls, 12 inch terra cotta blocks; provide all necessary footings, and 8 inch terra cotta walls for cellar window areas. Exterior walls, above grade 8 inch terra cotta blocks, with stucco finish. Cellar floor, 4 inches of concrete, with half



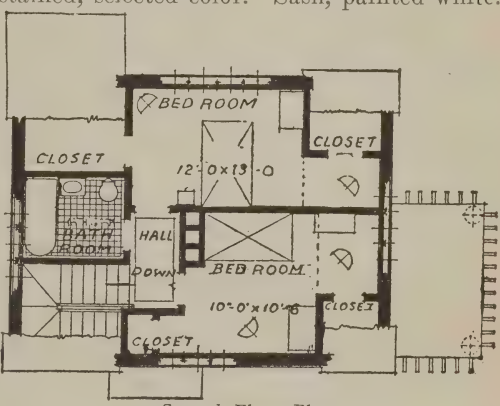
First Floor Plan.

inch finishing coat of cement mortar. Side porch floor, selected red tile, 6x9 inches, with cement, mortar joints. Chimney, common sound, hard burned brick, with stucco finish on exterior parts. All flues to have fireclay flue lining, and living room fireplaces faced with selected hard brick, and lined with firebrick.

Carpentry work—Rough framing. Floor joists, 2x10 inches, Hemlock 16 inches on centers. Rafters, 2x6 inches, Hemlock. Studs, 2x4 inches, Hemlock. Floors: All sub-flooring common pine. Finished floor in first story, oak. Finished floor in second story yellow pine. Doors and trim, cypress. Sash, white pine. Roof, laid with clear, white cedar shingles, 8 inches to weather.

Plastering—All interior walls and ceilings lathed and plastered. Three coat work.

Painting and glazing—Exterior trim, painted white, three coat work. Interior trim, stained, selected color. Sash, painted white.



Second Floor Plan.

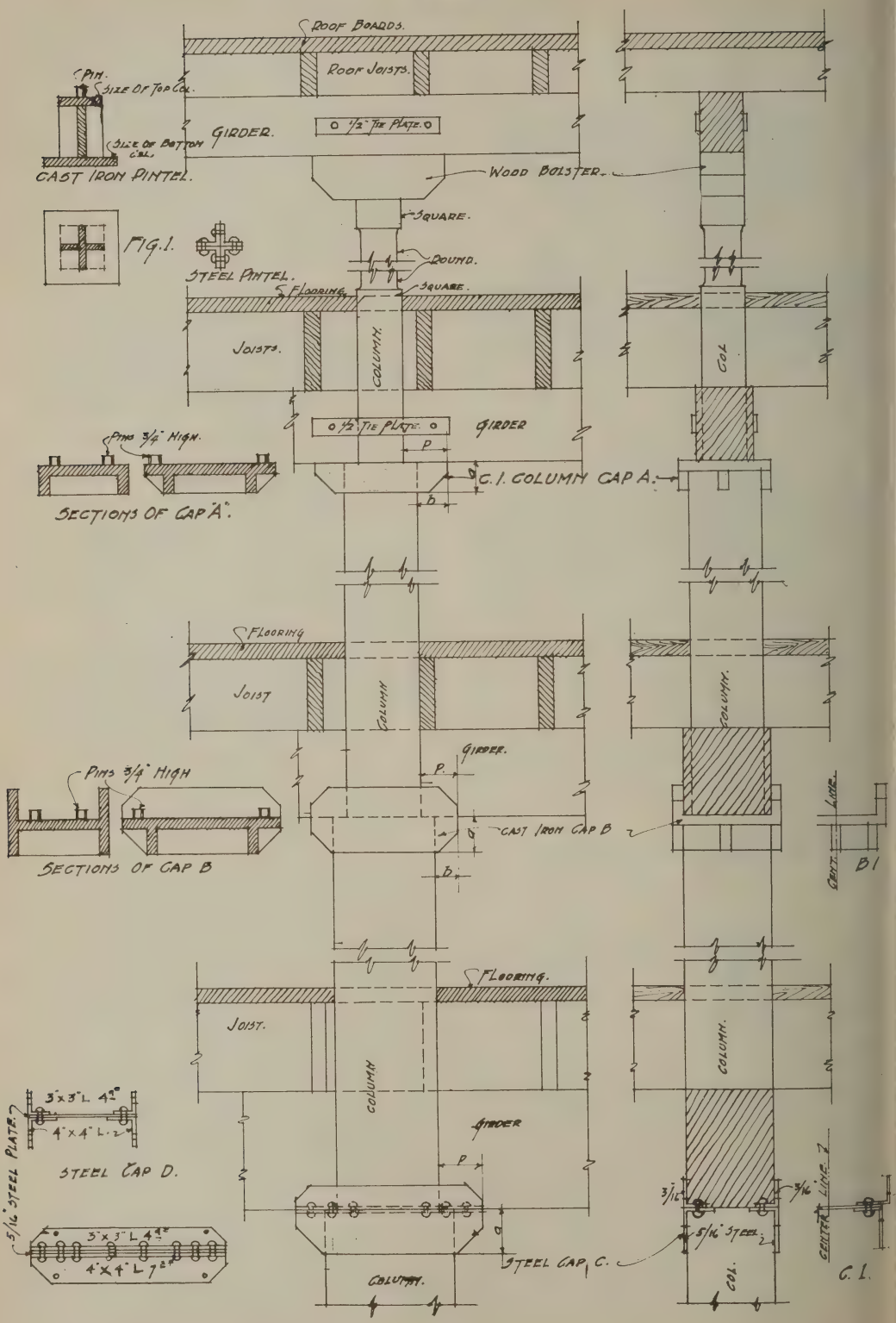
Floors stained. Shingles, dark green stain. Sheet metal work, painted two coats. Glass to be D. S. A.

Hardware—Hardware substantial stock design, and of good quality.

Story Heights—Clear story heights, cellar, 7 feet, 6 inches; first story, 9 feet; second story, 8 feet.

Costs in this building are estimated by the architects and checked up by the committee of awards as follows:

Excavation and grading	$ 50
Masonry, terra cotta, tile brick work and plastering complete	1,790
Carpentry work, including all trim, and shingle roof, complete	500
Hardware	35
Painting and glazing	100
Tin work	25
Total	$2,500
Area covered by house proper	602 sq. ft.
Cubical contents	15,650 cu. ft.

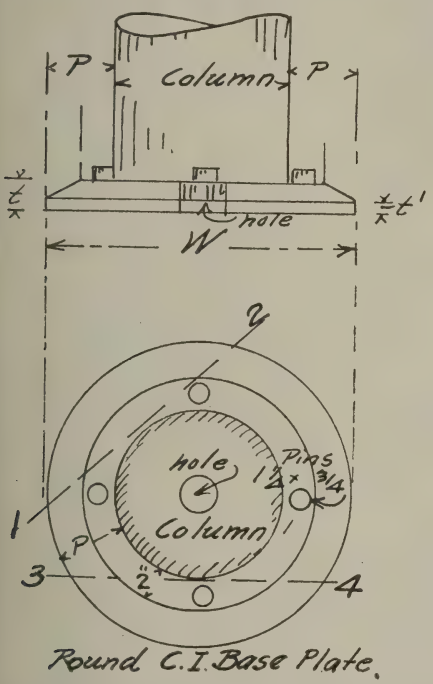

ROOF BOARDS.
ROOF JOISTS.
PIN.
SIZE OF TOP COL.
SIZE OF BOTTOM COL.
GIRDER.
1/2" TIE PLATE.
CAST IRON PINTEL.
WOOD BOLSTER.
FIG. 1.
STEEL PINTEL.
SQUARE.
ROUND.
FLOORING.
JOISTS.
COLUMN.
COL.
PINS 3/4" HIGH.
SECTIONS OF CAP A.
C. I. COLUMN CAP A.
JOIST
SECTIONS OF CAP B
CAST IRON CAP B
CENT. LINE
B1
3"x3"L 4#
4"x4"L 12#
STEEL CAP D.
5/16" STEEL PLATE
3"x3"L 4#
4"x4"L 7 2/3#
STEEL CAP C.
3/16
5/16" STEEL
CENTER LINE
C. I.

Builders' Reference Tables

By J. G. ROBINSON

POST OR COLUMN CAPS AND PINTLES.

THE usual method of connecting columns and girders is shown in detail on the opposite page. There are the cast iron caps A, B and B1, and the steel caps C, C1 and D, and also a cast iron and a steel pintle at Figure 1. B1 and C1 are one-half end views of caps, showing how a cap can be widened to suit a girder wider than the column.



Round C.I. Base Plate.

The detail shows the usual method, which is to use a wood bolster of Yellow Pine or Oak for a cap to carry the roof load if not too heavy, or if the area of the top of the column does not have sufficient bearing surface to be within the safe limit of the wooden bolster across grain, a plate of cast iron or steel may be used; the size and thickness should be computed as for templates under girders on wall bearing, as given earlier in this work.

The cast iron caps should be computed for the projection P as per the safe compression strength of woods across the grain as given in a former table, and add one inch or more to P if necessary to meet the requirements of a and b; a and b should be equal, but never less than three inches. This is quite necessary as the caps are in shear and tension and require a greater proportion than when in compression only.

The sides of the caps B and B1 above the bottom line of the girder are of no great value, except to keep the upper column from slipping. The cap A is really the best and cheapest and most readily handled.

The steel cap D is most easily and cheaply constructed, and requires less care in computing for load; the projection P should be the same as for a cast iron cap. The caps C, C1 and D as drawn are strong enough to carry safely a combined live and dead load of 24,000 pounds by using the size and weight of angles given; if heavier loads are to be carried, larger angles and plates should be used in proportion to weight, but always select the strongest material and be on the side of safety; a few pounds of iron or steel, more or less, in a cap should not be considered.

PINTLES.

Pintles are used only where it is required (which is seldom) that the girders should bear directly on the column. This drawing shows how they are made. The cast iron pintles are usually made in one piece, and are therefore more or less unhandy, besides the top and bottom plates should be dressed true to each other. The steel pintle shown to the right, bearing steel plates for top and bottom and separate from the uprights is much more convenient and desirable.

The pintles should be at least one-half inch less in height than the depth of the girder, if such girder is twelve inches or less; if girder is over twelve inches figure the shrinkage at one-half inch for every twelve inches in depth; for a fifteen inch girder allow five-eighths of an inch for shrinkage, so that the floor will not catch on the top plate and be made to look ugly and uneven at the posts.

For former articles on this subject, see January, 1912, pages 42-43; February, 1912, pages 42-43; March, 1912, pages 42-43, and May, 1912, pages 92-93. Back numbers can be obtained.

Honeysuckle.

Vines for the Home

By IDA D. BENNETT

THE subject of vines is a comprehensive one, embracing as it does both annual and perennial varieties; vines which are chiefly valued for the shade they afford and those which in addition to grateful shade and drapery furnish an abundance of flowers, some of them of exquisite beauty and fragrance.

Not all vines are suited to all situations, but so great is the wealth of this class of plants that it is possible to select just the variety wanted for the particular place in mind. If a quick-growing, rampant vine is needed for immediate effect, then one of the annuals should be chosen. The range of these is not quite so broad as that of the perennial varieties but still it is wide enough to meet most wants.

The most common use for a vine of any description is for porches and the side of the house; here the Japanese morning glory is of much value, especially if the situation is a west exposure. East and south lights are not so desirable, as the sun quickly shuts up the flowers—often before one has opportunity to enjoy them, but on the north side they will remain open a considerable part of the forenoon.

Another valuable vine for the house and porch is the Japanese Kudzu vine and the dolichos in mauve or in white. All of these are quick growing, clean foliaged vines untroubled by insect pests of any kind. The flowers of the mauve dolichos present lovely shades of white, lavender and mauve in the same spray and are fine for cutting. The cobaea scandens is another annual vine (or green-house perennial grown in the open as an annual), which covers itself during the greater part of the summer with lovely large, bell-shaped flowers of varying shades of white, lavender, mauve and purple. It like the dolichos is easily raised from seed started in house or hot-bed early in spring and planted out when the weather is warm; but the seeds of the cobaea decay easily and in planting them they must be put in the ground on edge and kept fairly dry until up and growing.

Another good vine for use about the foundations of a house, over low walls and wherever a not-too-tall vine is needed is the variegated Japanese hop. This comes up from self sown seed of the previous summer so that once established one is always sure of plants. The stems are somewhat rough and prickly, catching and adhering to everything, which is its only bad characteristic and the beauty of the large leaves divided into seven segments like a woodbine and wonderfully variegated and splashed with white, with gray and with dark green is beyond criticism.

Then there are many vines of the ornamental gourd family that are beautiful in foliage and in fruit. Not the least beautiful of these is the bryonopsis—a variety with pale green, ivy-shaped leaves and small round, green fruit striped with white, which on ripening turns to a lovely bright scarlet striped with white. These fruits are about the size of a large gooseberry and glow like rubies or garnets among the green of the foliage.

The mormodica is another member of the gourd family with elegant, effective foliage. Like all the preceding it is easily grown from seed as a common morning glory, is clean foliaged and free from the ravages of insects.

These vines will all be found equally desirable for covering trellises and summer houses as for use on porches or walls. They are not so desirable for pergolas and a few other positions as some other vines which we will consider.

Where one can wait for the development of a perennial vine of hardy constitution there is nothing better than any one of the various clematis. Indeed these are, par excellence, the vines for all times and places and so greatly have they been improved in the last few years and so important have been the additions to this valuable family that it is now possible to have clematis in bloom from April till October. There are two new clematis after the fashion of C. Paniculata, which come into bloom as early as the last week in April, continuing well into May when the large-flowered lavender and white come into bloom. Of these C. Montana Grandiflora is claimed to be a stronger grower even than the old, well-known native variety. It bears flowers one

and a half to two inches in diameter, in masses like paniculata. A rose-colored form of the above is found in C. Montana Rubens which, if the florists may be believed, is a real acquisition and one I am looking forward to possessing in the near future. This class of clematis branch freely from the root making a mass of foliage from the ground up which is quite different from the habit of the Jackmanii type which grows to a considerable height before spreading out; it is for this reason not so desirable for covering porches or arbors. One beautiful feature of the clematis is the ease with which it may be trained along any support—as the top of a fence or the railing of an upper porch; this is especially true of paniculata and in such positions it is at its best, as it will cover itself with a sheet of white every inch of the way. Our native variety loves to hang long garlands of bloom from aloft and for this reason is exceedingly graceful on arbors and pergolas if it is not allowed to grow too rampantly and wild.

The paniculata is sometimes difficult to start and will sometimes kill in unexpected ways. I lost several remarkably fine vines which had covered the house with a sheet of white every fall for years by the abuse of painters employed to paint the house—one of the conditions of the job being that they should not injure the vines. It is mystifying, the destructive tendencies of ignorant workmen. I have known men employed about the grounds to seize a vine and tear it up by the roots when they thought I was not looking, and that in the face of the fact that I had cautioned them against injuring the vines and shrubs about the grounds where they were at work.

Many of the large flowered clematis may be raised from seed if one cares to take the time; the seed germinates very slowly—in from six weeks to a year, but the plants will usually flower the second year. The first year they are better grown in pots plunged in the sand box and wintered in the cellar, planting them out where they are to remain the following spring. They will make considerable growth the first year in the open and the second—when two years old—may be expected to bloom. I have raised some fine plants in this way and find it interesting to watch the seedlings develop.

For covering foundations and wherever a low vine is required there is nothing better than the English ivy as it is evergreen and always decorative; it does better on the north and east side of the house than on the more exposed west or south; it clings so closely and has so neat a growth that it is always valuable. There is another attractive vine for low situations—the Ampelopsis tricolor which should prove an acquisition if one can judge from what the catalogues say of it; I have not grown it long enough to speak with authority, but I am expecting to be much pleased with the single plant I possess. It has a finely shaped leaf of dark green, beautifully variegated with pink and white and in the fall covers itself with berries of a peculiar peacock blue which adds much to its attractiveness. It should prove a good vine to train about balustrades and below and up the sides of casement windows as it will, doubtless, prove easy of management and training.

For twining up porch pillars there is a charming vine which is rare enough to be considered new—the Polygonum Baldschuanicum; it twines round and round its support and throws sprays of feathery white flowers at the terminus of every branch all through the summer and fall. And there are the various passion vines the freest blooming of which are Southern Beauty and Constance Elliot. Unfortunately these are not hardy at the north, but must be lifted and wintered in the cellar, but they make so strong and rapid a growth that they well repay the labor involved and the flowers are a constant delight. Southern Beauty shows the unusual feature of three colors—red, white and blue—in the same flower and is both beautiful and unique.

The well known woodbine will always be popular as it is effective and lives to a great age. It is inclined to grow straggly and to bear its foliage largely at the tips of the branches unless it is kept trimmed back to encourage a free branching and vigorous growth. Unfortunately it is much beloved by various caterpillars, which detracts somewhat from the pleasure of growing it at close quarters. This is also the case with the various honeysuckles, some of the most charming vines when in bloom, but so given to being covered with a disgusting gray louse which leaves a greasy deposit on everything over which the vine hangs as to make it impossible to harbor it. I have never entirely succeeded in eradicating this pest and have

been obliged to cut down several handsome vines on account of it. One vine that was a delight when in bloom, perfuming the entire lawn with its fragrance, I made every effort to save, even going to the length of peeling all the bark from the branches and burning it, but the lice appeared in as great numbers the following year. Unfortunately kerosene emulsion, the only effectual remedy, cannot very well be used on vines against the house without greatly disfiguring the woodwork and windows against which it falls, but that has not deterred me from its use in my efforts to save the plants. I have known vines, however, belonging to other people which were not troubled at all with the insect, but my experience has been discouraging in the extreme. This, however, is the only vine which has ever given me serious trouble; my usual trouble being that they grow and thrive too well.

But to sum up the question of vines: It all depends upon the care that is given them. A carefully trained and groomed vine of any description will give pleasure, while the rarest and most desirable species allowed to run riot over everything will fail to please. A vine should be allowed to cover the space allotted it but once. If it goes to the top of the trellis and then straggles unsupported for any distance, finally falling to the ground and obscuring the earlier growth and the blossoms it may have made, the effect will be untidy and unpleasant. It is, therefore, necessary that all vines grown about the house be kept well in hand and allowed to grow only where they are wanted. They may be trained around doors and windows with excellent effect, but should not be allowed to grow across them unless needed for shade. Certain vines which are in the main attractive are to be avoided, owing to an unfortunate tendency to drop the lower leaves about mid-summer, giving the vines a very untidy and ragged appearance; among these may be cited the wild cucumber; this is a very pretty vine when covered with its graceful sprays of feathery, greenish-white flowers and would be valuable for quick effects but for this one fault. It grows along any support—as the top of a wire fence or an abandoned clothes line, blossoming every step of the way and in some such unconventional position is altogether beautiful. I grow it more or less every year, indeed it is difficult not to grow it once it has become established on the place, so freely and vigorously does it self-sow, but I try to eradicate it as soon a it shows signs of deteriorating. I even grow it in window boxes in combination with double pink petunias and geraniums where it is particularly charming, but I pull it up and substitute other vines when it has passed its prime. It is fine for covering rocky ravines or other rough places and for wild gardening and in any place that is not expected to be well groomed or for positions where the lower part of the vines is hidden by other growths —as tall plants and the like, but is not strictly desirable for porches.

A charming vine for the north or east side of the house and where a slender, delicate vine will answer is found in the Allegheny line; this is a biennial vine making a ferny stool of leaves the first year and vining the second; it grows to a considerable height and its pale green, feathery foliage and delicate flowers are very attractive. In hot situations the vine is apt to burn and fade but in sheltered positions it is lovely. It self sows and comes up in all sorts of unexpected places so that once established on the grounds one is sure of always having a few plants. I have never seen any kind of insects on the vine and the foliage is very clean and healthy.

The culture of all vines is practically the same: The soil should be dug deep and when the planting is along the foundations of the house, where the soil usually consists of sand, gravel and hard pan thrown out in excavating the cellars and foundations, it will be necessary to remove considerable of this soil and fill in the excavation with good rich soil from the garden; with this should be thoroughly mixed a good fertilizer—either barn-yard manure or ground bone; in this the vines may be planted and the soil well firmed about the roots.

Vines of all kinds require a great amount of water if they are to do well, and an occasional spraying of the foliage will increase their growth and beauty. Japanese morning glories require to be literally soaked with water at least once a day if they are to produce notable flowers. Cobaeas require less water and seem to be equally at home in any situation, blooming as well on the north side of a building as in the sunshine, and standing without serious injury the hottest sun and situation. Clematis, also, do

well most anywhere, though if I should suggest a choice of positions it would be to give a preference to an eastern exposure. In planting clematis, florists claim that they do rather better if the feltilizing material is placed at a little distance from the roots, in little pockets as it were, that the roots may reach out and find it and not make so close a mat of roots as is the characteristic of the plant. And in all planting it should be remembered that no manure should come in actual contact with the roots when first planted.

The matter of furnishing support for vines is one of no small importance as, unless well sustained, they are liable to come down in a heavy rain. For perennial vines the wire poultry netting furnishes the most secure support available and it should be firmly secured to the house or porch with wire staples. A good way to erect this netting is to staple it firmly at each end to stout pieces of wood and to fasten these strips to the house with screws or with long hooks screwed into the house over which the frame may be hooked; in this way it is easily removed when the vines need to come down for any reason—as cleaning or painting the house or to lay down the vines for winter protection.

Annual vines which must be removed each fall do better on cords, and this should be of a nature not seriously affected by the weather. Wool twine does very well and if taken down in the fall when the vines are removed, will last for a season or two. The best way to arrange strings for plants is to place a number of staples at top and bottom of the space to be covered, setting them opposite each other and commencing at one side tie the cord to the first staple and pass it back and forth from top to bottom until the last staple on the lower side is reached where it should be fastened with an easily untied knot. Then when it is time to remove the dead vines, by untying the first knot at the top of the vines the whole cord can be pulled out from the bottom, releasing the vines at the same time and a considerable amount of tedious work avoided.

Some vines—as the trumpet vine—cling to any rough surface by aerial roots thrown out at every joint. In the case of young vines these are effective, but old vines become very top heavy and apt to break away from any support in a severe storm and once they have torn loose are ever after hard to support. A strong collar of galvanized wire or an iron band passed immediately below or through the head and securely fastened to the object on which it grows is the only secure fastening. If this object is a tree the band may be spiked to the trunk if sound, if not it may encircle both vine and tree, being further supported by a projecting limb stub or a thickening of the trunk below it.

Dead vines growing on wire trellises or fences may sometimes, when sufficiently dry, be removed by burning—in fact the use of fire simplifies many kinds of work about the garden.

A Modern Home

By E. G. W. DIETRICH, Architect

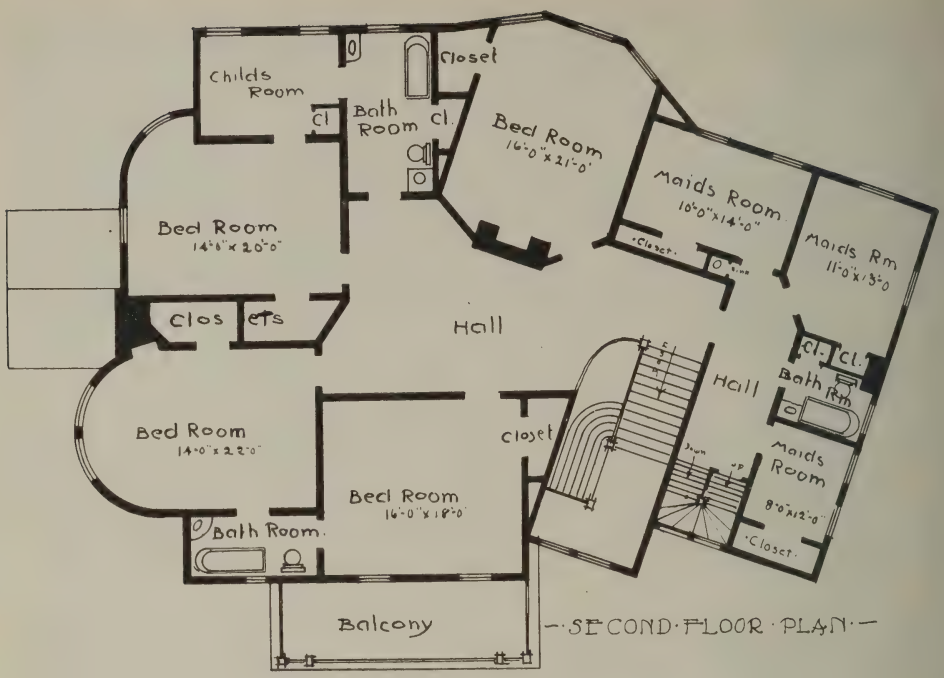
IN every part of our country there are uncounted homes where the ordinary requirements for comfort are sadly lacking and a far greater number in which the union of beauty and utility is absolutely lost sight of; such is not confined to the small, low cost and medium priced houses alone, but the same is frequently met with in houses where money predominates over good judgment.

In planning a home there are many considerations in the development that are never thought of until too late to be rectified; there are many difficulties met with that unless the underlying principles are fully understood and appreciated, household art will be a failure. They cannot be applied successfully by the inexperienced, hence the many proofs in evidence of the lack of civic pride in the developments of speculative builders. Artistic success is not dependent wholly on the money one spends, but judgment in planning must likewise receive careful consideration. To produce perfect harmony no untrue emphasis can be introduced of false notes, the design must show movement of perfect simplicity.

The subject under consideration is built on the slope of a hill, with a thick wooded

Residence at Morristown, N. J. Side View. E. G. W. Dietrich, Architect.

Residence at Morristown, N. J. Front View. E. G. W. Dietrich, Architect.

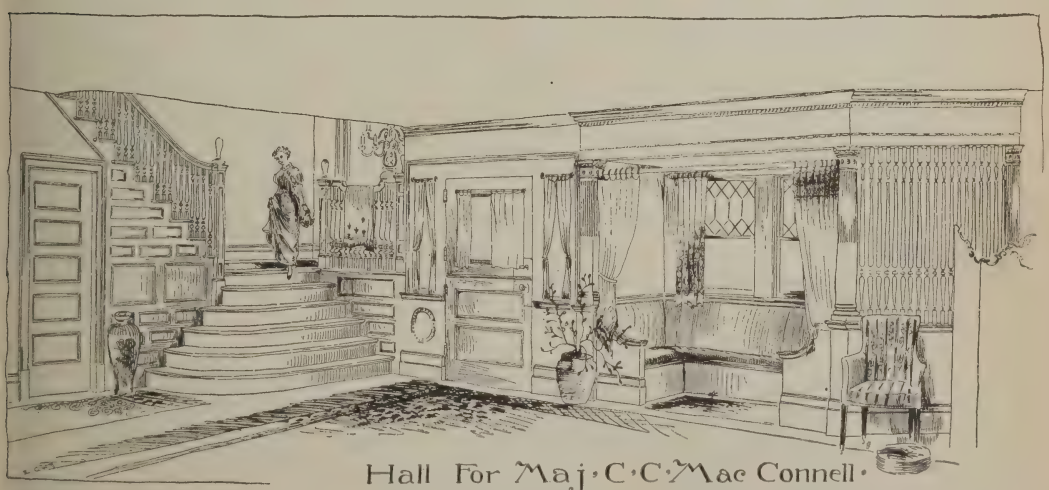

Childs Room
Cl.
Bath Room
Cl.
Closet
Bed Room
16'-0" x 21'-0"
Maids Room
10'-0" x 14'-0"
Maids Rm.
11'-0" x 13'-0
Bed Room
14'-6" x 20'-0"
Clos
ets
Hall
Cl.
Cl.
Bath Rm.
Hall
Bed Room
14'-0" x 22'-0"
Closet
Bed Room
16'-0" x 18'-0"
Maids Room
8'-0" x 12'-0"
Closet
Bath Room
Balcony
SECOND FLOOR PLAN

Bath Room
Bed Room
14'-0" x 15'-0"
Closet
China Cabinet
Dining Room
16'-0" x 21'-0"
Seat
Library
14'-0" x 18'-0"
Clos.
Porch
Pantry
12'-0" x 15'-0"
Kitchen
14'-0" x 22'-0"
Hall
21'-0" x 30'-0"
Closet
Parlor
15'-0" x 20'-0"
Nook
Seat
Vestibule
Platform
Down
UP
Hall
Shore Room
Porch
FIRST FLOOR PLAN

background, and a view to the front, overlooking Morris Plains in the distance and mountains beyond, with a small lake in the foreground. The lofty trees of the native woods come up close to the house, half burying it, so that only the circle frontage can be seen, giving a charm and graceful unity to everything, except from the dictations of fashion, at the same time avoiding false doctrines and slavish precedents. The thoroughly sound practice of simplicity has been adhered to, and the use of ordinary materials and methods of work combined with the resources at hand. There is no stinginess manifested either on the exterior or in the planning; there is no attempt made other than utilitarian principles; it is not imitative, but rather creative and inventive. There are no ancestral lineages than has influenced the design, although on several occasions it has been called Georgian by ones who are supposed to know better in the vernacular.

Each elevation differs from the other and yet the effect produced is a remarkable note of perfect sympathy, care having been exercised to maintain a bond of unity in the handling of details so as to bind the mass as a whole.

In the interior we do not find that well-defined Colonial plain, i. e., a large hall running through from front to rear, but in place of such we enter into a large square hall from which the main rooms open. With a flood of light this hall might be used as a living room with its large nook provided with a comfortable seat, a generous fireplace and ample furniture space. It provides a rather attractive hall, with a broad easy stairway, entirely different from the stairways so familiar in the Colonial homes, yet Colonial details have been successfully adapted to this stairway; such as twisted or spiral newels, gracefully turned balusters, and moulded hand rail. The livable parts of the house have been planned strictly on utilitarian ideas. No attempt has been made to cling slavishly to precedents from antiquarian trammels, but care has been taken to avoid grotesque effects. The results are perfectly satisfactory; a comfortable, convenient home, with large rooms cheerfully arranged. One is impressed with the straightforward simplicity and directness of hospitality that prevails throughout. It may not be agreeably and sympathetic in every nature, but to no one possessed of any catholicity of taste or breadth of appreciation can it fail to give pleasure or fail to appear as a work of quiet outstanding merit, while by many its first sight is greeted with real admiration.



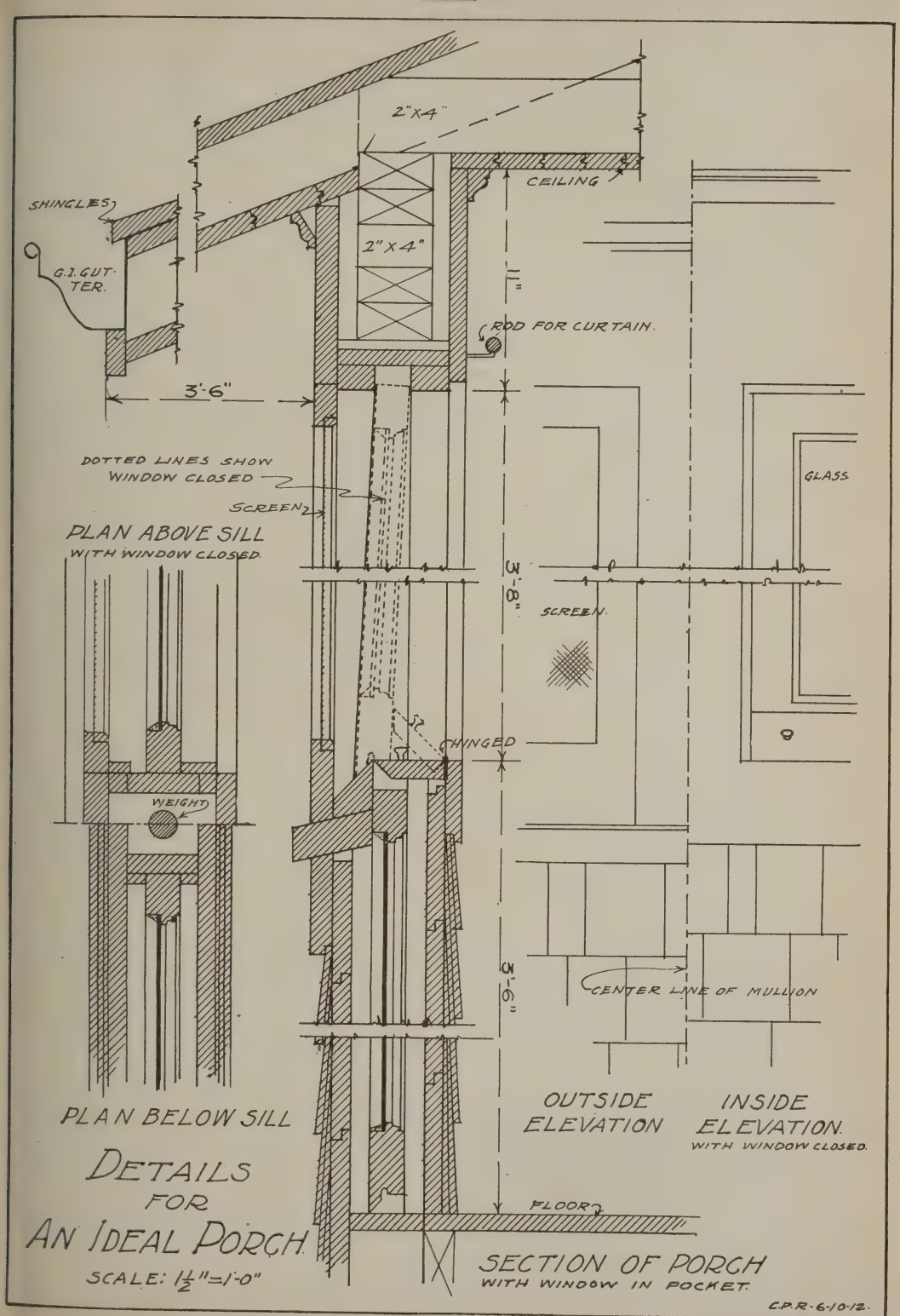
Hall For Maj·C·C·Mac Connell·

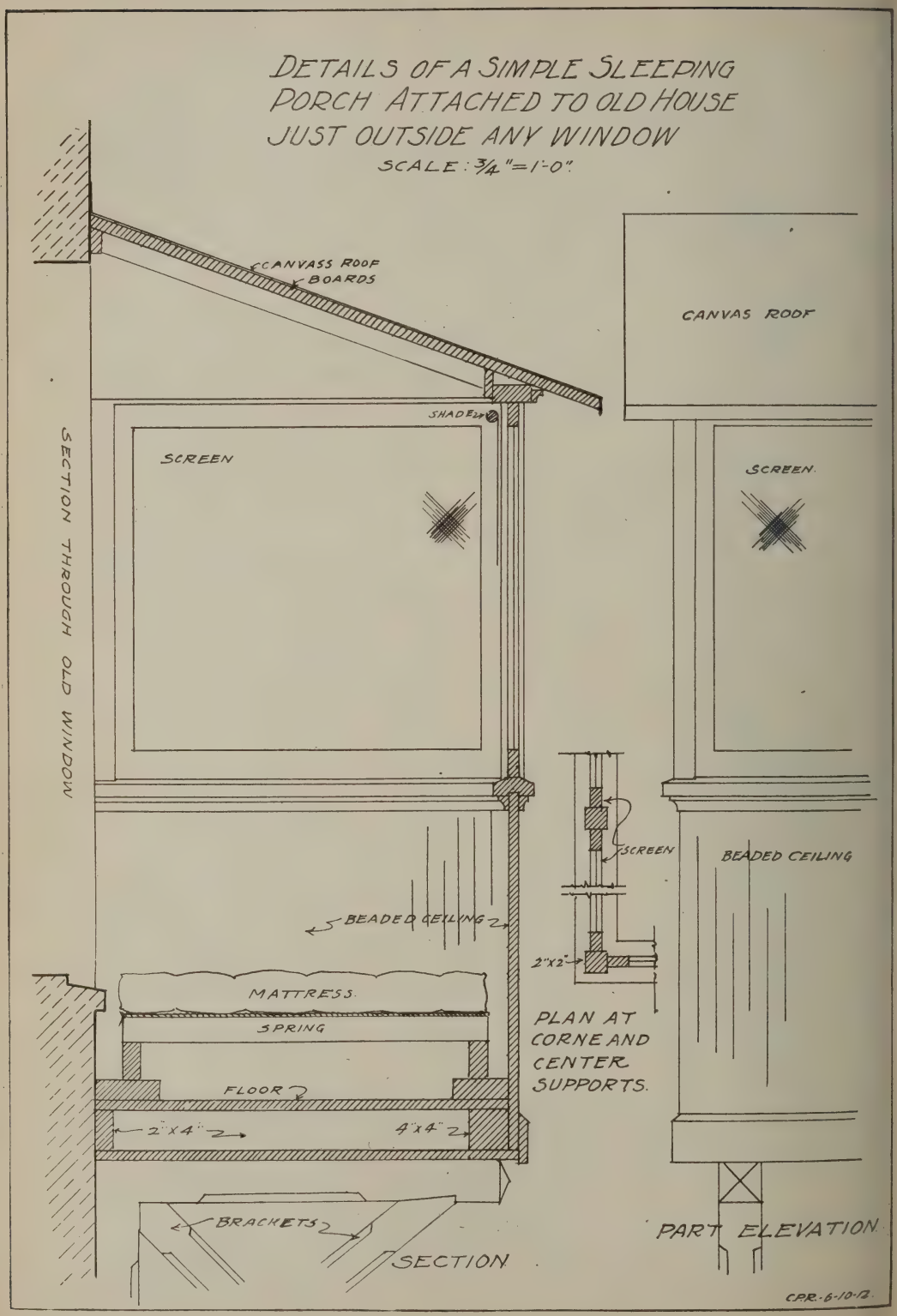
·E·G·W·DIETRICH·ARCHT·
·30·32·EAST·20TH·ST·N·Y·C·

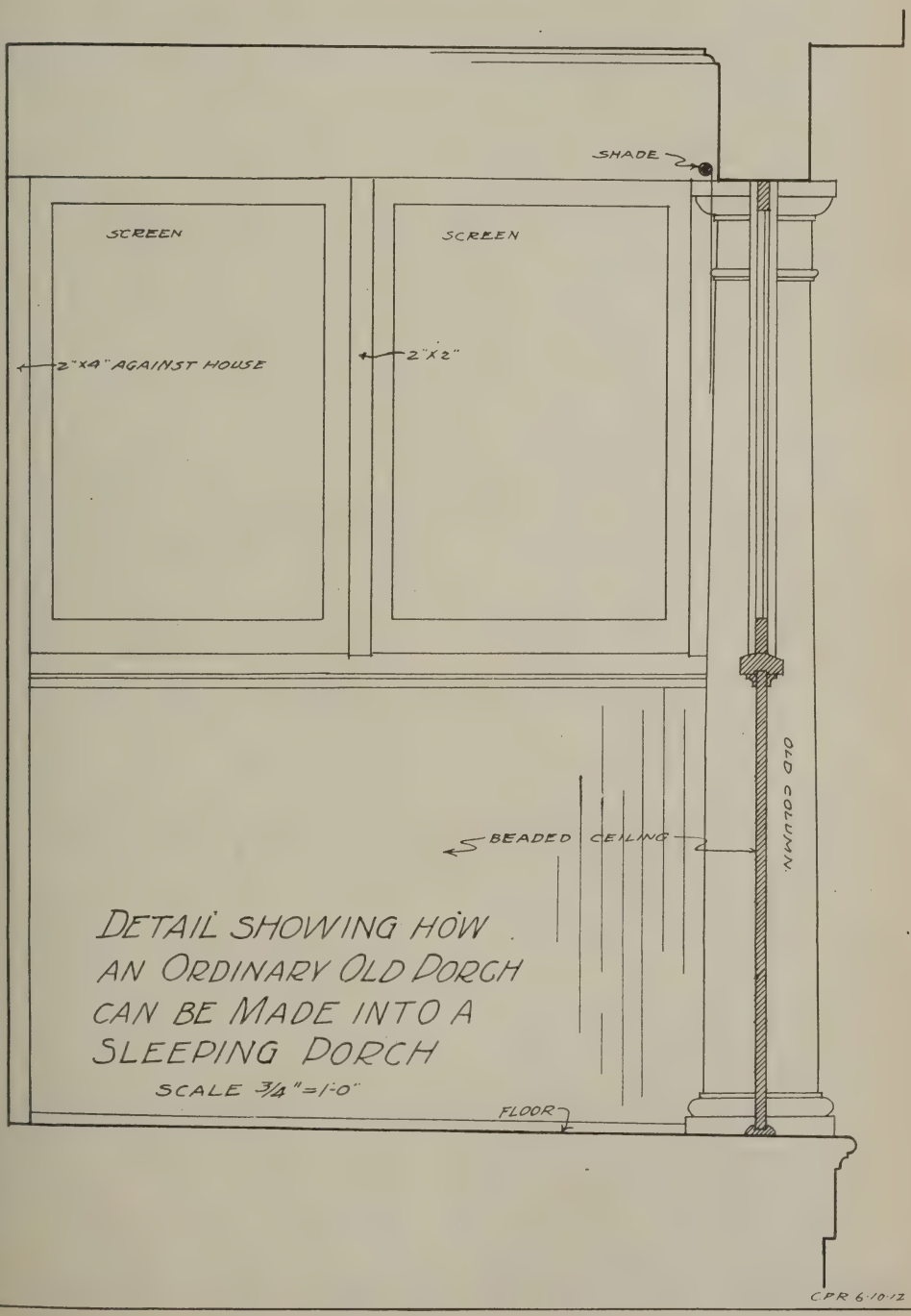
Sleeping Porches.

By CHARLES P. RAWSON, Architect

SCIENCE advances with age and we find ourselves confronted with many new problems, questions, etc., and among them, that of the prevention in preference to that of treatment of various ailments and discomforts. Fresh air being one of the chief elements for existence, it behooves us to make more rigid strides in obtaining it and maintaining its purity. To one confined and secluded and bound by the environments of modern city life this is especially true. That sleeping porches are good things, better than medicine for many of the ills of the day, does not have to be argued. But sleeping porches can be made very uncomfortable if built without the proper thought. Why make the mistakes of others and "murder" your sleep and inflict injuries to your health or irritate your calm nature into a passion of furor by the rain, wind, cold, heat, flies and noise of the streets. Let the sad experience of others be your watchword for mistakes. If you do this you can plan a perfect sleeping porch which will reward you with such sleep as you could never have conceived of, indoor sleeper that you have been. If you are building a new house you can have these things as you wish, your architect permitting. Most of us probably will have to patch on to an old house and as a rule they do not take kindly to the idea and we must add them where we can and as we can. There are certain rules which must be observed, however, if you would profit by the mistakes of others. Your porch must be on the second or third story and the best location is at the back of the house. Of course, a lot depends on the arrangement of the bed rooms, etc., but the porch must be so placed as to get the greatest privacy and the least sunrise. There should be at least two open sides so as to get plenty of air without leaving the porch doors open into the house. In the winter it is essential in order to keep the dressing room warm. The best plan is to place the porch in an angle of the house with two sides open. The bed is then placed in the angle of the open sides facing away from the light. The porch must be roofed with the ceiling painted dark. The outer boundary should be a wall and not a railing, and in a new house it may be a continuation of the sides of the house. It should be from three to four feet high and screened tightly from this point to the ceiling. The screen should be of fine copper wire. It is not necessary to have the floor slanted or provided with a gutter, as scarcely ever does any rain get in. The doors leading to the porch should be double, partly of glass and left without a sill. The furnishing should be simple, an extra chair, a chest for extra clothing and a small table is all that is necessary in addition to the bed. The details show the ideal porch with windows which drop down into pockets in the wall like those of a street car. They can be easily closed when desired. The screens are secured in place with hooks. Shades of canvas should always be provided. The second detail shows a simple arrangement which may be provided outside any window on an old house. This porch or balcony is just large enough to accommodate the bed, the spring being placed directly on the floor. The bed is entered through the window. The last detail shows how an ordinary porch can be converted into a sleeping porch at small expense and one of this kind is far better than none at all even if some of the specifications named above do have to be left off. The drawings are all made to scale.


2"X4"
CEILING
SHINGLES
G.I. GUTTER.
2"X4"
11"
ROD FOR CURTAIN.
3'-6"
DOTTED LINES SHOW WINDOW CLOSED
SCREEN
GLASS
PLAN ABOVE SILL
WITH WINDOW CLOSED.
3'-8"
SCREEN.
HINGED
WEIGHT
3'-6"
CENTER LINE OF MULLION
PLAN BELOW SILL
OUTSIDE ELEVATION
INSIDE ELEVATION.
WITH WINDOW CLOSED.
DETAILS FOR AN IDEAL PORCH
SCALE: 1½"=1'-0"
FLOOR
SECTION OF PORCH
WITH WINDOW IN POCKET
C.P.R.-6-10-12.


DETAILS OF A SIMPLE SLEEPING PORCH ATTACHED TO OLD HOUSE JUST OUTSIDE ANY WINDOW
SCALE: 3/4"=1'-0"
CANVASS ROOF BOARDS
CANVAS ROOF
SHADE
SCREEN
SCREEN
SECTION THROUGH OLD WINDOW
SCREEN
BEADED CEILING
BEADED CEILING
2"X2"
MATTRESS
SPRING
PLAN AT CORNE AND CENTER SUPPORTS.
FLOOR
2"X4"
4"X4"
BRACKETS
SECTION
PART ELEVATION
C.P.R.-6-10-12.



DETAIL SHOWING HOW AN ORDINARY OLD PORCH CAN BE MADE INTO A SLEEPING PORCH

SCALE 3/4"=1-0"

Sanitary Equipment of the Modern Building

By CHARLES F. SMITH

IN the design and construction of the modern building particularly of the house of moderate cost, close attention is paid to the arrangement of floor plans, and to all the architectural features; but to three important items entering into the construction and equipment of the building, and seriously affecting the health and comfort, if not life itself, of the occupants of the building; namely, the plumbing, heating and lighting, but little, if any serious attention is paid.

This neglect is not intentional, but is due largely, if not wholly to the failure on the part of the owner, architect and builder, to recognize the importance of the items mentioned, and also to a lack of knowledge from a sanitary view-point, as to what should and what should not be installed. It is therefore the intention in this and succeeding articles to describe in plain terms, with as little technical matter as possible, the correct design of these installations, and the proper materials and fixtures to select for a satisfactory equipment, and the reasons why.

Plumbing:

There is not an item entering into the construction of a building of such vital importance to the occupants as the plumbing installation: poor workmanship, improper or imperfect materials, or faulty fixtures, any one or all of these may be present, permitting insidious, poisonous gases to permeate the house, breeding malaria, typhoid and other diseases ending often in the death of one or more members of the family before the trouble is detected and corrected.

Drain Pipes:

Certain terms are applied to different parts of the piping system of a plumbing installation, although they may be connected together into one continuous line; but it becomes necessary, in order that the different sections shall be properly designated.

The house sewer is that part of the main drain pipe, or sewer line, extending from a point about two feet from the outer house wall to the street sewer, or cesspool, as the case may be; the house drain is the main horizontal line extending from the vertical soil line to the house sewer. The fresh air inlet is a line of pipe of same diameter as the house drain extending from a point outside the outer wall about one foot above grade, and about ten feet from the nearest window, or other opening into the house, where it is surmounted with a return bend, or some patented air inlet device, to a connection on the house drain just inside of the main house trap, and is intended to provide fresh air for the ventilation of the drainage system. The end of the fresh air inlet should never terminate in a so-called street box, a metal box placed at the street level, usually near the curb, and covered with a metal grating; the box soon becomes filled with dirt, the grating often broken, and the air inlet absolutely inoperative.

The soil line is the line to which the water closets are connected. It is extended through the roof, and above the last fixture becomes a vent line. The waste line is the one to which the waste from lavatories, bath-tubs, sinks and wash-tubs is connected, and it in turn is connected to the soil line, if its termination is above the first floor, or to the house drain if at the lower floor. The waste line is not always a vertical line, it usually connects at each floor to the soil line. The vent line is a vertical line extending as a loop from its connection to the house drain below the lowest fixture, to its connection to the soil line above the highest fixture: to this line the back vents are connected from the various fixtures. If there are no plumbing fixtures above the first floor, this line becomes unnecessary and may be omitted, but if there are water closets in the house, the soil line must be extended full size through the roof. Where no water closets are installed in the house, only such fixtures as lavatories, sinks, etc., the vent line, if such is used, or its equivalent, the waste line must be extended through the roof enlarged not less than twelve inches below the roof, to four inches in diameter, and extending at least four feet above the roof. Under no circumstances should the termination of this soil, or vent line, be placed near, or in line with any window or other opening into the house, nor should it be placed near a chim-

ney, as the poisonous gases discharging from the vent pipe are very likely to be carried down the chimney, poisoning the air in the rooms, when the chimney is not in use. No cowl, bend, or covering of any kind should be placed over the top of the vent line.

The vent line is intended to ventilate the drainage system, and to prevent breaking of the seals in the traps by syphonic action, its proper installation is therefore most important. If it is extended through the roof of less diameter than four inches, it will not be of sufficient area to answer the purpose, and in winter will almost surely be entirely closed by hoar frost. The writer has seen country houses with the vent line carried two inches in diameter a short distance above the roof, surmounted by a short increaser to four inches in diameter, presenting the appearance of a funnel, and making an excellent receptacle for leaves, birds nests, etc., utterly defeating the object for which it was intended.

In some countries it is the universal practice to carry all drainage and vent lines on the outside of the building, connection being made to the various fixtures through the walls. This is contrary to American practice, and is not good practice. Ventilation of the drainage system cannot be as efficient, the pipes are not accessible for repairs or alterations; poor material and faulty workmanship are very likely to prevail because of the inaccessibility, and connections must still be made to the fixtures within the building, thus presenting the same possibility of the escape of poisonous gases within the house, as with the American practice.

In some foreign countries and also in some of our own southern cities, separate soil and waste lines are required, the soil lines discharging into the street sewer, and the waste lines together with the roof leaders discharging into the gutter at the curb.

This is done where a sewage disposal system is in use, and is not by any means a bad plan. It prevents defiling of our rivers, lakes and local waters, and makes use of a valuable product, which in so many of our American cities, particularly on the seaboard, is thrown away. A separate sewer system for the waste water is more expensive, but where it can be installed, certainly keeps the streets in a cleaner and more presentable condition. The writer some few years since designed the installation for a large building in a prominent South African city, where it was required that the soil line should discharge into a septic tank in the sub-basement, provision being made for cleaning out the tank as required; the waste line and roof leaders discharging into the street sewer. In that case also the soil is made use of for fertilizing.

Whatever disposition may be made outside of the building of the discharge from the plumbing fixtures, whether into a septic tank, cesspool or sewer, the plumbing system inside the building should be most carefully installed, and the selection of materials, and the fixtures themselves, most carefully considered to the end, that not alone lower first cost, but durability and perfect sanitary conditions shall be attained.

Materials and Methods:

In the piping of a plumbing system, three materials enter largely into the construction, and they are cast iron, galvanized wrought iron, and lead. Brass pipe makes a somewhat more durable job, and a very nice job, but its high first cost makes its use very rare; next in desirability and in cost comes galvanized wrought iron, but that too is too high in cost for general use on the drainage system, and its use is therefore usually restricted to the water supply, and perhaps a few short waste and vent connections from the fixtures to the main cast-iron stacks; but even in these cases lead is more generally used, largely because of the ease of handling. Cast iron, consequently, is left as the most universally used of all materials in the installation of a plumbing drainage system. No earthenware or tile of any kind should be used inside a building in connection with a drainage system. It is too liable to fracture, and is likely to be carelessly installed.

There was one instance in the writer's experience where it was found necessary to install a tile waste line to carry an acid solution, as the acid would soon destroy a metal pipe, but that was carried as a separate line direct to the sewer, with its own tile trap, and was very carefully supported and protected from injury. Under the circumstances, it seemed to be the only available material, and its use permissable, and in the six or seven years of its use has given not the slightest trouble, but that was a special case where nothing else would answer.

There are two grades of cast iron pipe in

use for plumbing work, that are known to the trade as "standard" and that known as "extra heavy." As a matter of fact the nomenclature should be somewhat reversed; that known as "extra heavy" should be "standard" and the other as "extra thin." Not any of the so-called "standard" cast iron pipe should ever be used within a building in connection with the plumbing system; it is almost too thin to even stand proper calking, and is liable to be full of sand holes and blow holes, which, after the pipe has been coated, it is almost impossible to detect. It is hardly permissable even to use it for outside leaders where leakage is less likely to be so objectionable, but even there the slight difference in cost should not weigh in its favor. No cast iron pipe to be installed within a building in connection with the plumbing system should be coated, or painted, until after it has been erected and tested; the coating temporarily fills small holes and other imperfections, rendering them impossible of detection at the time, but later when the coating has worn away, the imperfections make themselves manifest by the escaping gases. Only extra heavy, cast iron, coated pipe should be used for underground work, although, where there is a good natural soil foundation outside of the building, tile pipe could be used for the house sewer, if carefully graded, and the joints well cemented with neat Portland cement, the inside of the pipe being left perfectly smooth. Where the house drain passes through the outer wall, care should be taken to leave a space of at least one inch on each side of the pipe, to provide for settlement, or heaving of the pipe from any cause. This may be done by inserting a tile pipe sleeve, not less than two inches larger in diameter than the outside diameter of the house drain, or by leaving a brick, arched opening in the wall of sufficient size for the pipe.

No black, wrought iron or steel pipe should be used in connection with the plumbing system or water supply; it must invariably be galvanized, and of the grade known as "standard."

Lead pipe used for waste, vent and soil connections is only of short lengths, and should not be thinner than the grade known to the trade as "D." The thickness of lead pipe used for the water supply will depend upon the head, or pressure of the water; "A" grade being used for 50 pounds pressure and "AA" grade for 75 pounds pressure per square inch. The writer, however, prefers to use galvanized wrought iron pipe for the water supply; if the pipe freezes the lead pipe is as likely to burst as the iron pipe, and the lead pipe is always in danger of being cut by rats or mice, frequently drops from the tacks and gets out of shape, and is more liable to injury from various causes. The wrought iron pipe goes up quickly, stays where put, makes a neat looking and serviceable job, is easily replaced if necessary and costs less.

In calking the joints of cast iron pipe, only new picked oakum and soft lead should be used: the ring of oakum should not be too thick, as to make a good gas-tight job, not less than 12 ounces of lead should be used for each inch in diameter of the pipe, thus a four-inch pipe would require forty-eight ounces, or three pounds of lead.

If galvanized wrought iron pipe is used for the drainage system, special galvanized, extra heavy cast iron, recessed and threaded drainage fittings must be used. All fittings on the drainage system must be "long turn" bends, "Ys" and "TYs" to make possible an easy flow of the soil, and prevent the stoppage sure to prevail at short turns.

For outside leaders, sheet metal pipe is generally used, usually galvanized sheet iron, sometimes copper, which makes a more durable job; but whenever sheet metal pipe is used, the lower end should always terminate, not less than five feet from the ground, in cast-iron pipe securely held in place to the building, and if connected to the house drain, or sewer, must be provided with a "running" trap, with two hand hole cleanouts of same diameter as the pipe; where the leader does not connect to the sewer in any way, but merely discharges to the ground or gutter, it may be provided with a cast iron leader elbow. The joint between the sheet metal leader and cast-iron pipe is made with a ring of oakum and cement.

Inside leaders must always be of cast, or galvanized wrought iron pipe. When making up wrought iron pipe, red, or white lead and linseed oil or, some other good pipe cement, of which there are several in the market, should be applied to the male threads only. This serves as a lubricant when putting the pipe together, and in hardening prevents the small leaks that would otherwise develop from imperfect threads.

The waste line from the refrigerators, or from the lead safes placed under lavatories to catch drippings, is usually of galvanized wrought iron pipe, but must not in anyway be connected to the plumbing system. It must instead be arranged to drip into an open sink, or other trapped and water supplied fixture. The importance of this is not always realized; the human system can only absorb typhoid germs by means of our food and drink, usually in water or milk, but these substances are readily infected by the germs in sewer gas, yet we often see refrigerators with the waste directly connected with the plumbing system, or dripping into the open end of a pipe which is so connected. If we could be sure that the water seal in the trap of this sewer connected pipe would always remain unbroken, there would be an element of safety in it, though the danger of contamination would still be ever present; but on the contrary we may be very sure that the seal will be broken not once, but many times, in any one of three different ways; by syphonage, the most common trouble, by capillary attraction, and by evaporation. The syphonage is caused by discharge from another fixture when the trap is not properly vented, and under such circumstances is of very frequent occurrence. The breaking of the seal by capillarity is due to the sediment, hairy slime, fine hay, etc., from the melting ice, which collecting on the lips of the trap, will carry the water over from the seal, faster than the ice supplies it. Breaking of the seal by evaporation occurs when the percentage of humidity in the atmosphere is low, and little or no water is supplied to the traps; for this reason every trap connected to any fixture should be supplied with water at frequent intervals, and because of this evaporation no floor drain should be connected direct to the sewer system, but only through a water supplied trap; however, as the house drain is usually suspended from the basement floor beams, as it should be, there is little likelihood of connecting a cellar floor drain into it.

(To be continued.)

Building Contracts

By W. J. STANTON

Unless expressly restricted by the terms of the contract the contractor is not necessarily required personally to perform the work but may sublet it. Building contracts sometimes provide that the contractor shall not sublet the work, but such a provision is for the benefit of the builder, and may be waived by him. If the contractor sublets the work in violation of a provision in the contract, he is not, by reason of such provision, released from liability to his subcontractor for breach of the contract.

Building contracts frequently provide that if the contractor or builder fails to perform the contract, the architect or engineer in charge of the work shall audit and certify the amount of damages suffered by the one for the default of the other, and that his certificate shall be conclusive upon the parties. The binding effect of such a stipulation is recognized by the courts, but the certificate may be impeached for fraud or bad faith on the part of the architect or engineer. Unless the determination of the amount of damages resulting from a breach of the contract is expressly referred to the architect or engineer, his decision upon the question is not binding upon the parties.

Where the compensation is due only upon the performance of the contract it is, as a general rule, necessary to entitle the contractor to recover thereon that he show a performance of the contract. A literal and strict performance is not required, and if the contractor, acting in good faith and intending and attempting to perform his contract, does so substantially he may recover in an action on the contract notwithstanding slight and trivial defects in performance, for which compensation may be made by an allowance to the builder; but the builder is entitled to an allowance for the damages he may suffer by reason of failure to perform strictly. As a general rule the amount to be allowed to the builder in case of a substantial performance is the necessary cost of remedying the defects or omissions in performance; but where the cost of remedying the omissions

would be very large as compared with the benefit which would be derived therefrom by the builder, he has been allowed as a deduction only the difference in the value of the work as done and its value if it has been done in strict compliance with the contract.

The question whether the contract has been substantially performed is, as a general rule, a question of fact depending upon all the circumstances of the case. Thus,it has been held to be a question for the jury whether there was substantial performance or that where the compensation was to be one thousand dollars, and the contract was completed except in regard to small matters which could be completed for one hundred dollars; that the compensation was to be seven thousand dollars and the defects could be remedied for two hundred and seventy-five dollars; that the compensation was three hundred and ninety dollars and the cost of remedying defects thirteen dollars and eighty cents; that the compensation was six thousand dollars and the defects would cost six hundred and fifty-six dollars. If the failure to perform the contract strictly is done knowingly or in bad faith, the contractor is precluded from claiming a substantial performance, and the same is true where the omissions and departures are so substantial as not to be readily capable of remedy, and an allowance to the builder out of the contract price would not give to him essentially what he contracted for.

If the contractor does not substantially perform the contract, and performance has not been waived or excused, he cannot maintain an action on the contract for the compensation payable upon the completion of the work. Still, if the contractor acted with a bona fide intention of performing the contract, and the builder retains the benefit of the labor and materials expended in the partial performance and derives benefit therefrom, the law will imply a promise on the builder's part to pay therefor, and the contractor may maintain an action for compensation. When the contractor abandons his contract and leaves materials on the builder's premises which the latter makes use of in completing the work, the contractor is entitled to recover the value of such materials.

The basis of the contractor's recovery for the partial performance of the contract is the benefit received by the builder therefrom, and therefore if the builder has received no benefit therefrom, the contractor cannot recover for such partial performance. Where the contract provides that upon the failure of the contractor to complete the work, the builder may do so at his expense, and the builder completes the work upon the contractor's failure to do so, the latter may recover for his partial performance the contract price less the expense incurred by the builder in completing the work. If before full performance, the contract is rescinded by mutual consent, the contractor may recover the value of the work performed. The measure of the contractor's recovery for a partial performance seems to be the value of the labor and materials, having reference to the contract price, not to exceed the benefit received by the builder, with the additional right to the builder to recoup his damages by reason of the contractor's failure to complete the work.

If the builder, through his wrongful acts or omissions, prevents the further performance of the contract by the contractor, or if he fails to perform stipulations in the contract to be performed on his part and which are conditions precedent to further performance by the contractor, the contractor is excused from further performance, and may recover compensation for his part performance. For example, full performance is excused where the contractor is prohibited by the builder from continuing the work or is ousted by the builder from the premises upon which it is to be done; where the builder fails to furnish the materials for the work as required by the contract; where the contract is for the erection of a structure in a city and the builder fails to procure from the city authorities the necessary building permit, by reason of which failure the contractor is unable to complete his contract; where the builder fails to pay the installments of the compensation stipulated for in the contract and payable as the work progressed; or where the builder fails to perform certain work which he had agreed to do and which was necessary to further performance by the contractor. The inability of the contractor to perform the contract, not due to any wrongful act or omission of the builder, is no excuse for his failure to perform.

(To be continued.)

Finishing Cypress

By A. ASHMUN KELLY.

CYPRESS may be finished in more than one way, or in at least two ways, namely, painting and varnishing. The secret of painting cypress lies in the mixing of the paint. Make the first or priming coat of white lead mixed with raw linseed oil and turpentine and a very little driers. Too much driers will cause the paint to dry so quickly that it will not have sufficient time to enter the pores of the wood properly. The subsequent coats may be made rather stiff, and it should be well brushed into the wood.

Interior painting of cypress will do best when the prime coat consists of white shellac varnish, a pure grain or denatured alcohol solution. This should be quite thin, and when dry it should be rubbed down with fine sandpaper. The painting may then be done in the regulation way, as for ordinary or white pine wood.

When cypress is to be coated with enamel paint, first apply a thin coat of white lead paint thinned with turpentine and raw oil, half and half, with a little driers. Let this become perfectly dry and hard, then carefully sandpaper, being particular not to take off any of the sharp edges, etc. This is followed with three coats of flat lead paint, each coat being lightly but smoothly sandpapered when hard-dry. Then apply two coats of flat zinc paint, and one coat of enamel, which is to be rubbed with felt or the like, to produce an egg-shell gloss, and then give the finishing coat, the full gloss enamel.

Cypress may be painted with perfect results, but when one sees its natural beauty of grain and shadings one is inclined to express regret that it should be covered over with paint. Certainly it looks better when finished with varnish. It should, too, be finished natural, though it will take a stain perfectly, and it may be stained in imitation of mahogany, rosewood, cherry, black walnut, and any of the oaks, or it may be colored with stains to any desired shade the fancy may dictate.

Cypress may be filled either with a heavy shellac coat, or with a liquid filler, according to amount a person is willing to spend on the work. Being a close-grained wood it does not require a paste filler. If it is to be finished natural all that will be required after the shellacing is the rubbing and the coats of varnish. But if to be stained, then it is best to first apply a very thin coat of orange shellac, though for water stain it is better to use a gelatin size instead of shellac. The size in either case is to keep back an oil natural to this wood. Also, the wood must be perfectly dry when water stain is used, as the stain is apt to raise the grain of the wood very badly when it is not well dried out. And cypress is a very difficult wood to dry out. But, once dry, it may be treated with about as little trouble as any wood. Even three coats of shellac have in some instances failed to hold back the natural oil. I might add here that oil should never be applied to this wood. Some think a coat of benzol on the bare wood is very useful, while others advise mixing the stain with strong vinegar, following this when dry with a thin coat of shellac, then with a coat of copal varnish. As water stain will always raise the grain of a wood more or less, it may be better in the case of cypress to mix the stain with turpentine.

Cypress may be finished pretty much as we finish cherry or birch. First shellac it, sandpaper is when dry, then follow with two or three coats of shellac, rubbing down each coat to a smooth surface. Finish the last coat with pumice-stone powder and oil to an egg-shell gloss, or French polish it if preferred. Some treat inside trim with shellac or liquid filler, as previously stated, according to the price of the job, and following with copal varnish, one or more coats, a dull finish being most in favor.

Cypress may be stained to imitate mission oak by applying a stain made from drop black ground in japan, adding a touch of rose pink, mixing the colors with varnish to form a stiff paste, then thinning out with turpentine to make the stain. Strain through cheesecloth. The stain may be made lighter or darker by either thinning more, or by adding more black.

If a greenish effect is desired, omit the pink and add dark chrome green to the desired shade. Antique oak may be obtained by a stain made from two parts of Vandyke brown and one part of raw umber, adding also a trifle of drop black, all these pigments to be ground in japan. Mix to a paste with varnish and thin out with turpentine. The final finish may be done either in rubbed or flatted varnish, or will do also wax finished, as preferred.

For a more comprehensive description of cypress finishing as well as for all other woods used, see the Expert Wood Finisher, a new manual which will be supplied by this publication.

Laying, Scraping and Care of Oak Floors

By W. L. CLAFFEY

LAYING OAK FLOORS.

THE laying of oak flooring is not very difficult. Any first-class carpenter can make a good job. Some judgment and care is very necessary in order to produce the best results.

A sub-floor should be used under both the 13/16 in. and 3/8 in. thicknesses. The sub-floor should be reasonably dry and laid diagonally. Boards of about 6 in. wide are preferred. These boards should not be put down too tight and should be thoroughly dried and cleaned before the oak flooring is laid.

It is well to use a damp proof paper between the oak flooring and the sub-floor. Where sound proof results are desired, a heavy deadening felt is recommended.

Oak flooring should be laid at an angle to the sub-floor. After laying and nailing three or four pieces, use a short piece of hardwood 2x4 placed against the tongue, and drive it up with a sledge.

The nailing of oak flooring is very important. All tongued and grooved oak flooring should be blind nailed. The best floor made can be spoiled by the use of improper nails. The steel cut variety is recommended for all blind nailing.

For 13/16 in. use 8 penny steel cut flooring nail.

For 3/8 in. use 3 penny wire finishing nail.

The maximum distance between the nails should be:

For 13/16 in. thickness .....16 in.
For 3/8 in. thickness .....10 in.

For even better results, it is recommended the nails be driven closer than indicated.

CARE OF OAK FLOORS.

If one only knows how, nothing is easier than the care of a well finished oak floor. Water should never be used on a waxed or varnished floor. The surface may safely be wiped with a cloth dampened in tepid water to remove dirt and dust, but the dampness should be immediately taken up with a dry cloth.

One of the best mixtures for keeping a floor in good condition is the use of equal parts of sweet oil, turpentine and vinegar well mixed, and rubbed on the floor with waste or a cotton or woolen rag. The vinegar will cut the dirt or grime worked into the finish from shoes; the sweet oil produces a lustre and the turpentine promptly dries the moisture.

The above mixture need not be applied oftener than once a month to insure a floor finish that will resemble the sheen if a piano.

Should wax finish become worn in spots from hard usage, a little of this mixture thoroughly rubbed, will renew the finish quickly.

The occasional use of a weighted floor brush, alone or with a piece of Brussels carpet placed beneath it, will assist in keeping the finish of an oak floor in good condition.

Once a year, it is well to use a good floor wax and rub it into the floor with the aid of a brush, with or without a piece of carpet attached. Before the finish is worn down to the wood, an additional coat of wax should be applied and thoroughly rubbed.

SCRAPING OAK FLOORS.

After the oak floor is laid and thoroughly swept, it is best to scrape it, in order to get the best results for a nicely polished surface. This scraping process can be done by the ordinary scrapers, such as used by cabinet makers, or by one of the many types of power or hand scraping machines that are generally used by contractors and carpenters. Always scrape lengthwise of the wood and not across the grain. A floor properly scraped looks

very smooth, but still it should be thoroughly gone over with No. 1½ sandpaper to obtain the best results in finishing. After this, the floor should be swept clean, and the dust removed with a soft cloth. The floor is now ready for the finish.

ECONOMICAL USE OF OAK FLOORING.

As rugs are used almost universally in homes and offices, an economical plan is to have the center section of the room laid with oak flooring of a cheaper grade and to employ the better grades in the border. After the rug is laid, all parts of the floor will have the same appearance. A room, say 10 ft. x 12 ft. can have a two foot border of clear (first quality, either plain or quartered, and in the center section 6 ft. x 9 ft., select plain could be employed. A center section of this size, 15 per cent of the cost could be saved by using select plain. By using a little care in finishing up the select, this grade can be made to look very much like the clear grade. This makes quite a saving and is being done very extensively.

Three-eighths in. thickness by 1½ in. or 2 in. faces can be laid over old floors in old homes, or over cheap sub-floors in new homes very economically. It is cheaper than carpets or pine flooring, and will improve the appearance and sanitation of an old or new house more than the expenditure of double the amount of money any other way.

Letter Heads and Their Value

By IRWIN SPEAR

What is the first thing you do when a salesman steps into your office.

You "size him up," do you not?

He may be a very good salesman or a very poor one. But at first, what he looks—not what he is—alone counts.

Suppose he really is a poor salesman, yet makes a good first impression. You would surely give him a hearing "on his looks."

Now suppose a salesman came along, shabbily dressed—slovenly and uncouth. However good his talk, he wouldn't command the attention and respect that were due him. His lack of respect for himself, displayed in his slouchy person and unprosperous attire, would prejudice you against him.

A great many contractors who would not send out slovenly, ill-appearing personal representatives, are daily sending out hundreds of that kind of impersonal representatives—that is, letters which are representatives in print.

By inattention to what they have always thought of as a mere detail they are unconsciously handicapping themselves.

Business stationery is no detail. It is a big, important matter because it is always one of the ways the business world has of "sizing you up." Often the only way.

Great issues frequently turn on seeming trifles. A true story that illustrates this fact is told by a writer in the Chicago Tribune (Little Stories of Success). A business man made an article of unquestioned merit. Yet he could not sell it. He wrote to a successful friend asking him to diagnose the case and point out the reason. The reply was: "No wonder you fail. Any man who uses such stationery ought to fail. Get an attractive letter head that will reflect the quality of your goods and show faith in what you are selling."

The suggestion was adopted and from then on, according to the story, the business steadily improved.

Appearances do count. We are influenced by externals. This being the case is it wiser to ignore the fact or to make the most of it—to have stationery which hinders or that which helps?

The first cost is little if any more than the kind which hinders and in the long run it is much less.

Few builders, if any, will dispute the utility and economy of a business-getting letter head, but many will ask, "What constitutes a good letter head? How shall I know if mine is all that it should be? How shall I go about to improve it if it is not?" A good letter head should reflect the business from which it emanates. And as all the world by a seemingly polar attraction likes to do business with those who are prosperous and by a like repulsion avoids those who seem to be "down and out," so the letter head should convey an impression of prosperity. This

can be done (a) by selecting a good quality of paper; (b) by the quality of printing; (c) by the arrangement, design or wording used.

The second essential of a good letter head is individuality. The most successful businesses are the most individual. They have methods and ideas that are distinctive. They do things in a way peculiar to themselves.

The large metropolitan contracting concerns are good models to follow in this respect. Whatever they do "hangs together"—their advertising, their stationery, the signs used by them on buildings in process of construction, are " all of a piece," so that one helps the other. Each kind of advertising is consistent with all the other kinds done, and all bespeak the individual character of the business. Individuality in stationery is not so easily obtained as the air of prosperity. Good paper and printing can be had by any one who will pay the price. But distinction or originality, which are but other terms for individuality, are attained only by those who possess taste or an intimate sense of advertising values. The advantage of a distinctive letter head is in the fact that it impresses itself in the memory. It is easily picked out among a bunch of correspondence. You can remember Jones' letter by the broad yellow tint block down the left side and Smith's by the green and gold embossed trade mark, at the top.

So much for what the letter head should be and embody. Now for some of the things to avoid: Since the letter head reflects the business, it is essential that it should tell at a glance what the nature of the business is. Do not have your firm name loom up so large that it overshadows the fact that you are in the building business. The cut of a houses or of houses you have built serves well to bring out the kind of business.

A letter head should not be flashy. Some business men like to get a variety of colors on their letter heads. Generally speaking, this is no more desirable than a variety of colors in dress.

Do not try to tell "the story of your life" on your letter head. Your firm name, nature of your business, address and if possible a clever catch phrase are sufficient.

Regarding the catch phrase much might be written. It ties up your name with a thought favorable to you. Like the detective's star, or the marksman's medal, it is something by which you are distinguished—a mark of identification. If you are not using a good catch phrase in connection with your business, set your brain at work thinking one up. You probably will not get one that satisfies you at "the first crack out of the box." You will have to give the subject careful—almost prayerful consideration. Then some day like a flash it may be that the inspiration for your catch phrase will come. As an indication of the value placed on a good catch phrase by big business men, it is authoritatively stated that Marshall Field & Co. have a standing offer to pay $10,000 to anyone who will suggest to them a catch phrase which they will accept.

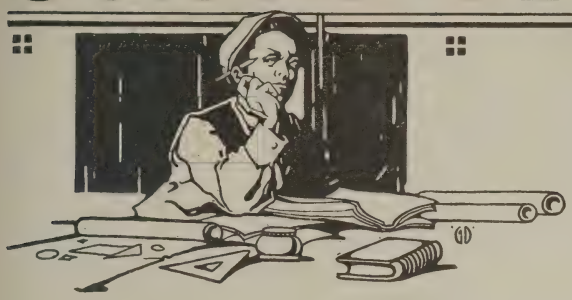
Now to return to letter head proper. Avoid the air of cheapness in your stationery. Better pay a few dollars more for paper and printing and get a letter head that will be worthy of you. Often good paper is spoiled by bad printing, or good printing is rendered of no effect by poor paper.

A good stock to use is a bond weighing 18 or 20 lbs. to the ream. Among the best letter head bonds are Damascus, which can be known by the water-mark of a Damascus blade, Old Jonathan, Hampshire and Kenesaw. These come in several finishes, laid, cold, pressed, etc., and in a variety of tints. White is a safe color to select for stationery, and carries a dignity and neatness that tinted paper cannot equal. However some of the most tasteful letter heads and most discriminating concerns use tinted paper. Many concerns make their letters distinctive by having their typewriter ribbons in a shade to correspond or contrast with the tint of the letter head. One well-known house for instance, uses buff Hampshire bond with the firm name embossed in a rich brown, and has brown inked ribbons, giving a very pleasing effect.

Embossing, while expensive, adds a touch of quality that is impossible to secure in any other way. A new process has recently been perfected for getting the effect of embossing by printing from type. Distinction or individuality may also be secured by using a letter head of different size from the ordinary eight by ten letter head size.

Next month the subject of letter heads will be continued in detail and a number of letter heads submitted in the prize competition will be reproduced. Good points will be noted and the faults of those open to criticism will be commented upon.

OUR READERS PAGES



[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Ed.]

Answers

CUTTING BRACES.

From J. E. T., Eagle Lake, Texas, replying to Big Boy, Nelson, B. C.:

Will say that if he will reduce his measurements 3 feet 6 inches by 4 feet 6 inches to inches and divide both by some number he will have an easy solution to his problem. For instance, 3 feet 6 inches = 40 inches, 4 feet 6 inches = 54 inches.

$$6)\begin{array}{l|l} 40'' & 6\ 4/6 \\ \hline 54'' & 9'' \end{array}$$

to express on the square we would say 6 8/12 inches by 9 inches, 6 times, which will give both length and cuts. Now let us suppose a case; says 17 feet 5 inches by 19 feet 3 inches, reduced to inches will be

$$12)\begin{array}{l|l} 209'' & 17\ 5/12'' \\ \hline 231'' & 19\ 3/12'' \end{array}$$

It will be noticed in this case we have just what we started with; only we have it in inches and twelfths instead of feet and inches, and by laying the square on our material 12 times, using 17 5/12 and (or by) 19 3/12 we will get both length and cuts required. This, of course, works just as well for rafters as for braces, and is the same principle as that used for cutting steps, whether it be door steps or stairs.

To illustrate: We desire to cut a stair stringer for, say, 9 feet 7 inches rise and 12 feet 7 inches run.

9 feet 7 inches = 115 inches. We desire about 9 feet 7 inches rise, so we divide 115 inches by 7 inches, which gives us 16 3/7 the number of steps; but we will not bother about the 3/7 yet, but divide the 115 inches by 16, which gives 7 3/16, the height of risers. Now we divide 12 feet 7 inches, which is 151 inches, by 16, the number of steps, which gives 9 7/16, the width of tread. So if we use 7 3/16 x 9 7/16 sixteen times, we will have a stringer of proper length, run and rise for a 9 feet 7 inch rise by 12 feet 7 inch run.

"We only need a teacher while mastering the rudiments of any science."

This is true because a principle once comprehended admits of infinite application.

DROP OF OIL.

From "Willie Field," Kansas City, Mo.

"Puzzled" should take a woolen rag and wrap it around a piece of flexible wire leaving a point sticking out of one end of the rag, then bend the wire and rag so that the exposed point of the wire will reach the oil hole. A little oil poured on the rag will follow the rag and wire down to the hole without dripping.

TOOLS.

From "L. De Long," Winnipeg, Man.

In answer to "Western Carpenter." He can scarcely go wrong in buying tools if he asks for the best of any particular tool the dealer can supply, and pays a fair price for them. As a rule American made are better adapted for the kind of work done in Edmonton, than English tools, but it must not be supposed English tools are not good, for they are, and in many instances are better, and will outwear tools of a similar kind made in America. The latter tools, however, are handier, finer finished, and do their work in good style. Stanley's planes, or iron planes with wood soles, are perhaps the best for general use; they seem more natural than iron planes, and they are not so cold to handle, which is an important matter in a town where the mercury often gets 40° or 50° below zero. The finest kind of saws should

be obtained and these may be had of the world's best make, such as Atkins, Disstons, or Simonds, any of which will give good satisfaction and excellent service. A good oil stone that will "cut" quickly and do good work, is the "India Stone," manufactured by the Niagara Carborundum Company, Niagara Falls, N. Y. You may supply yourself with all the chisels, gouges, draw knives, and other similar tools you may require, from any hardware store that deals in Barton or Bucks tools, they will give you satisfaction. All other tools which you will want, such as steel square, hatchets, etc., you can purchase almost in any town. Be sure and procure a good square, this is important. Other tools may be bought as wanted. Of course, I might say a good deal more regarding the buying of tools, their care, also their uses, but perhaps this would not be what is required.

STREET PAVEMENT.

From "Contractor," Duluth, Minn.

If K. M. B. wants to get the very best paved roads for his money, he should use bricks—hard paving bricks, or clinkers. A good brick paved road, laid as it should be, will continue in service for a very long time, and will remain good under hard work longer than either macadamized or asphalt surface. Paving stones or paving metal, as laid in some of the most traveled streets in our large cities, may outlast and outwear bricks, but they are rough to travel on, nerve shattering to ride over, and continually calling for repairs. Macadam makes an excellent road for work not too heavy, and if it were not for the dust raising that follows, it would make one of the best motor roads in use. An asphalt road makes a fairly good motor path and is smooth and springy and pleasant under the wheels. All composition and tar roads are delusive and should be avoided, if a good, lasting road is expected. As far as expense is concerned, it is safe to say that a good brick paved road will be cheaper and as lasting in the end as any other made road.

METAL SHINGLES.

From "Roland S.," Montcalm, N. J.

With regard to metal shingles, I may say to "Inquirer" that there is as much difference in the lasting qualities in metal shingles as in wood ones. A great deal depends on the quality of the metal employed, and the protective surface coating used for covering the metal. So far as the metal shingles themselves are concerned there is but small difference; the lasting qualities of the metal are more dependent on the protective qualities of the paint or other covering material. As a matter of fact, the writer prefers, after a long experience, wood shingles, and more particularly cypress ones; these look better and more natural, are as efficient and will last as long as any.

FRAMING BRACES.

From A. A. G., Canada:

In answer to Big Boy's inquiry in May BUILDER I would advise him to reduce both runs of the brace he uses for an example into inches, which will give him 36 inches on the girth run and 48 inches on the post, then by taking 9 inches on the tongue of the square and 12 inches on the blade and stepping this off four lines he will have the correct length and marking along the tongue at one end and along the blade at the other will give the bevels.

STEEL TAPE FOR FRAMING.

From A. A. G., Canada:

In answer to Subscriber, Nelson, British Columbia, I would advise him strongly to use a steel tape in all heavy framing, as I have followed up that class of work for twelve years and after the first year I never used anything but a fifty foot steel tape.

Carry a short scratch awl and fasten the ring at the desired point with this and use a pencil to mark the measurement.

ADDRESS WANTED.

We received a letter from "Inkster," P. O. Winnipeg, Man., from a man who has invented a portable "folding steel square," also two plans for workingmen's houses. There was no name signed to the letter, and as some questions in the letter seem to be important we will endeavor to answer them if the full address, with description of square is sent to us, and we may publish one or both of the plans received.—EDITOR.

Questions

CONICAL ROOF REAMING.

From H. F. C., Amory, Miss.:

As I have for several years been a constant reader of the BUILDER, and having never asked any questions through your columns, I wish to know if some brother carpenter or reader of your journal can assist me as I have been perplexed in two problems in roof mensuration for some time, and have never seen any geometrical draftings that would help me out of my difficulty.

The accompanying sketch shows the way by which I obtain cuts, lengths, etc., of rafters of conical shaped roof where same intersects roof of any pitch, and I hope that same may be of benefit to some brother reader.

However, if anyone knows of a shorter method that is reliable and accurate enough for practical use, I am one who is always ready and willing to learn the shorter and quicker methods.

The question I would appreciate having answered with drawings also, are as follows:

First. How on paper or with the steel square to lay off conical roof where same sets astride (or straddles) a hip.

Second. How would I proceed to lay off a gable where same, as in above case, sets astride of hip. Gable either being same or different pitch from roof on which it sets. Although I am aware of the fact that not very often one finds a gable so located, yet, however, I have seen same in several instances.

FIFTY FOOT TRUSS.

From J. M. W., Moose Jaw, Sask.:

I would like to know how to build a truss fifty feet long to carry a circular roof, which has settled in the center. It is my garage and I don't want to use any posts.

FIRE.

From "Want to Know," Chicago, Ill.

Can any reader tell me if there were any rooms in the great Equitable Insurance building, New York, that burned last winter, that escaped destruction by fire? Were there any lives lost during the fire and was there any part of the great building that was considered fireproof?

DEADENING.

From "Plasterer," Milwaukee, Wis.

Will some reader kindly inform we what is a good and cheap material to fill a lath and plaster partition with, so as to make it fairly sound proof? Sand is heavy and trickles out; sawdust, if not very dry causes mildew and sometimes rot. Any information will oblige.

CLEANING BRICKWORK.

From "One in Trouble."

I want to clean off quite a large surface of old brick wall, and would be grateful for any information that will be of service to me. Will it be best to wash the wall with some chemical composition, or make use of a wire brush to rub it down dry?

CONCRETE FENCE POSTS.

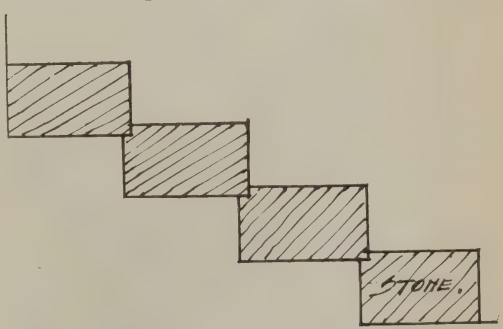
From "A Mortar Man," Dayton, Ohio.

I should be glad if some one or more of your numerous readers could advise me as to the following: I am desirous of replacing some rotten cedar posts in a fence with reinforced concrete posts, to be, say, four and a half by four inches. I do not know what reinforcement would be necessary to take the wind pressure on a close boarded fence 5 ft. high from ground, or perhaps a 5 in. post would be better.

A SELF-SUPPORTING STAIR.

From Curious, Nashville, Tenn.

The above sketch shows a flight of stairs in the Patent Building, Washington, D. C. This drawing is in about the right proportion, the stone steps not being supported by any carriages, but only by contact with each other. How?



RISE OF RAFTERS.

From a Subscriber, Brattleboro, Vt.:

How many inches rise to the foot of the different pitches on rafters? Name any place or places where they want carpenters and are willing to let a fellow learn.

MENDING MEERSCHAUM.

From C. N., St. Louis, Mo.:

Can you tell me through the question and answer department of THE NATIONAL BUILDER how to make meerschaum stick together when it is broken?

A WATER TIGHT CELLAR.

From L. H., Edmonton, Alta.:

I have contracted to make a water-tight concrete cellar 35 ft. long, 12 ft. wide and 7 ft. high. Do you think that a thickness of eight inches to the walls would answer this requirement, or could it be made less?

Octagon Problems

By A. A. STAFFORD

SUPPOSE you wanted to put some octagon corners in a box as shown in Figure 1. How would you find the length of the pieces

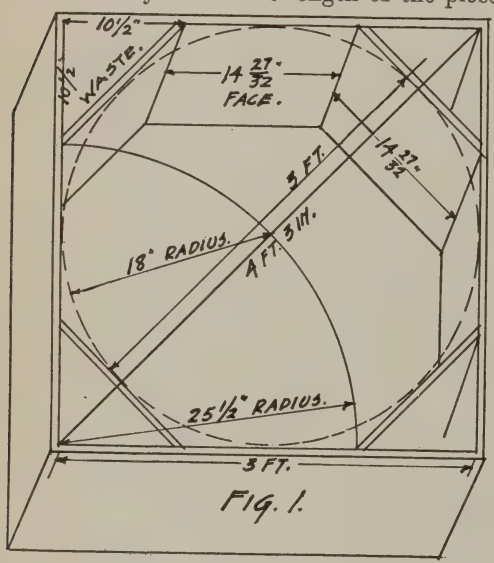


FIG. 1.

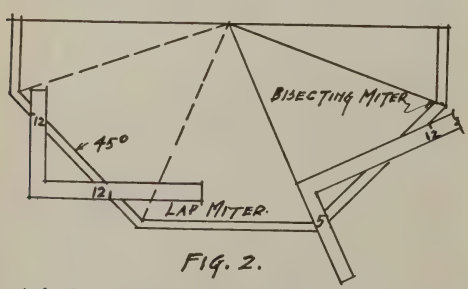


FIG. 2.

to put in? This is often done at foundries in moulders' flasks when casting a wheel; there are many places where it requires some work of this nature. The octagon rule I work from is one that was figured out by some one many years ago, but I apply it differently than some men do. After knowing the square of the box or timber, which ever it may be, to have a true octagon corner or shape, I take my square and rule and measure across the corner of the square, using generally one inch equal one foot. By the rule it is a fact that one-half the length of the hypothenuse of any rectangle or square, radius back to side, equals one face of the octagon, and the waste corner (see illustration), which is supposed to be 3 feet square. Now, to get the length of piece to form corner, as I spoke of, measure across corner of square 3 inches x 3 inches. Reads on rule 4¼ inches and equals 4 feet 3 inches divided by 2. Result 25½ inches (radius back to slide). Subtract from 3 feet, leaves 10½ inches waste corner; now measure again across corner of square 10½ inches x 10½ inches, reads on rule 14 27/32 inches, length of octagon face.

Proceed in the same manner on any size octagon wanted. Note that the lap miters of an octagon are always square or 45 degrees, while the bisecting miter is 5 inches x 12 inches, or equivalent on the square. See Fig. 2. Some places in concrete forms, it is a good idea to use one lap miter, then the form is easy to take out, starting at this miter. See how square lays to cut lap miter. This is also used to square up an octagon corner like on bay window sills, or any other angle if you know the pitch. Study every detail of the illustrations, as it may be of interest to you at some time.

Building Trade Interests in the Courts

By GEO. H. MURDOCK

Where a lessor is required by the lease to erect a building upon the land, it does not thereby become the agent of the lessor, with implied authority to create a lien on the lessor's interest for the improvements.—Atlas Portland Cement Co. v. Main Line Realty Corporation, 70 S. E. (Va.) 536.

The principal contractor is a necessary party to a suit to enforce a mechanic's lien against the building of the owner for material furnished by plaintiff to such contractor, to be used in the construction of the building.—Augir v. Warder, 70 S. E. (W. Va.) 719.

If the owner wishes to limit the amount for which his property may be made liable to a sum not to exceed the contract price agreed on by him and the contractor, he must have his contract recorded.—Williams & Davisson Co. v. Bailey, 70 S. E. (W. Va.) 696.

Where a lease requiring a building to be erected on the land by the lessee at its own expense is put upon record, such lease is notice of its contents to parties furnishing labor and materials to lessee in the erection of the building.—Atlas Portland Cement Co. v. Main Line Realty Corporation, 70 S. E. (Va.) 536.

A materialman, to acquire a lien, must deliver to the owner a duplicate statement of the materials delivered to the contractor when delivered, as required by Laws 1909, c. 45, though the owner has knowledge that the material is being furnished.—Finlay v. Tagholm, 113 P. (Wash.) 1083.

One furnishing to a contractor sashes, doors, and glass for a building is not a subcontractor, but is a "materialman," within Laws 1909, c. 45, requiring persons furnishing materials to a contractor to deliver to the owner a duplicate statement of such materials.—Finlay v. Tagholm, 113 P. (Wash.) 1083.

Where an action to foreclose a mechanic's lien was permitted to go to judgment in the state court notwithstanding bankruptcy proceedings against the owner of the property, such judgment, when filed as a claim in bankruptcy, was not reviewable as to minor amounts involved, or as to whether minor portions of the property were or were not parts of the parcel to which the lien attached.—Hobbs v. Head & Dowst Co., 184 F. (U. S.) 409.

Where a contractor claiming a lien was prevented from completing a building as required by the contract by the owner's failure or refusal to make payments as they matured, according to the contract, the contractor was entitled to sue on the contract for the amount due, and to foreclose its lien therefor, and was not limited to its remedy on quantum meruit.—Hobbs v. Head & Dorst Co., 184 F. (U. S.) 409.

The words "file with the owner," in section 3, c. 75, Code 1906, requiring a laborer or person furnishing material to a contractor to be used in the construction of a building to file with the owner or his authorized agent an itemized account, etc., are equivalent to the words "give notice to the owner," or "serve notice upon the owner."—Williams & Davisson Co. v. Bailey, 70 S. E. (W. Va.) 696.

A contractor to construct a building, who has full charge of the work, furnishing labor and materials, and who has the exclusive possession, save the right of the owner to come on the premises to ascertain whether the contract is complied with, is an independent contractor, for whose negligence in leaving an unguarded opening in the sidewalk into which plaintiff fell the owner is not liable.—Cary v. Sparkman & McLean Co., 113 P. (Wash.) 1093.

Where a building contract, in which there is a damage clause for nonperformance by a certain time, provides for payment by the owner of monthly estimates, any delays caused by the wrongful withholding of the same are excused. The wrongful withholding of the payment of monthly estimates does not excuse performance within the stipulated time, unless such conduct prevents performance, nor relieve the builder from damages where the delay in completion of the house is due to other and independent causes.—Chamberlin v. Booth & McLeroy, 70 S. E. (Ga.) 569.

An owner employing an independent contractor to construct a building according to plans calling for a building flush with the sidewalk, and a basement window, is not liable for injuries to a pedestrian falling into the basement through an unguarded opening left for the window, since the accident results from the failure to guard the opening, which is a mere matter of detail not affecting the owner, and since the ordinary method of doing the work does not create a nuisance, defined by Rem. & Bal. Code, Sec. 8309, as the unlawful doing of an act or omitting to perform a duty which renders dangerous for passage any street.—Cary v. Sparkman & McLean Co., 113 P. (Wash.) 1093.

The lessee of land agreed by the terms of the lease to erect a building thereon, and took possession and made contracts with general contractors for its erection, under which the work was done. The lessor in no way contracted with the general contractor, or authorized the furnishing of material, and the work was not done at its expense or request, and when the building was partly completed the land and improvements reverted to the lessor. Code 1904, and 2483, provides that, if any person who shall "cause" a building to be erected owns less than a fee-simple estate in the land, then only his interest therein shall be subject to mechanics' lien. Held, that the lessor did not "cause" it to be erected.—Atlas Portland Cement Co. v. Main Line Realty Corporation, 70 S. E. (Va.) 536.

Patents

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

1,022,661. Door. John C. Duner, Wheaton, Ill.

1,022,841. Building construction. S. Giletti, East Oakland, Cal.

1,023,939. Combined window awning and fire protector. W. W. Guy and O. L. Richards, Cushing, Texas.

1,023,014. Window sash lock. A. E. Hanson, Mason City, Iowa.

1,022,417. Fire escape. V. W. Heydlauff, Havre, Mont.

1,022,850. Concrete-reinforcing bar. D. Kerr, Youngstown, Ohio.

1,022,747. Trap door. O. W. Meissner, Westmount, Quebec, Canada.

1,022,505. Floor finishing and surfacing machine. Geo. S. Reynolds, San Diego, Cal.

1,022,568. Fire escape. R. Sideman, San Francisco, Cal.

1,022,889. Window sash lock. S. C. Sladden, New York City.

1,022,804. Window construction. C. F. Wallen, Cleveland, Ohio.

1,023,349. Method and apparatus for constructing concrete buildings. R. H. Aiken, assor. by mesne assign. to Aiken Engineering Co., Winthrop Harbor, Ill.

1,023,778. Concrete block molding machine. S. Allen and F. L. Bailey, Okmulgee, Okla.

1,023,723. Operating mechanism for sliding doors. M. Cosey, assor. Reliance Ball Bearing Door Hanger Co., New York City.

1,023,724. Concrete mixer. M. E. Crandall, Northfield, Minn.

1,023,726. Convertible window sash. H. F. Eilert, Cleveland, Ohio.

1,023,731. Sash balancing mechanism. E. Georgeff, Portland, Ore.

1,023,647. Window lock. E. Hill, assor. one-half T. A. Hill, Denver, Colo.

1,023,251. Floor surfacing machine. E. E. Hughes, Meriden, Conn.

1,023,656. Tile molding machine. A. Kern, Frankenmuth, Mich.

1,023,572. Seat-actuated flushing apparatus for water-closets. L. D. Lawnin, assor. N. O. Nelson Mfg. Co., Edwardsville, Ill.

1,023,748. Building block. E. J. McGettigan, Cleveland, Ohio.

1,023,673. Construction material. J. M. Neil, assor. A. M. Hay, Toronto, Ontario, Canada.

1,023,674. Binding or cementing material. J. M. Neil, assor. A. M. Hay, Toronto, Ont., Canada.

1,023,526. Partition and wall furring. H. Oliver, New York City.

1,023,926. Compound for waterproofing cement and the like and making the same. Geo. P. Dieckmann, assor. H. B. Hasbrouck, Mason City, Iowa.

1,023,837. Lathing securing tack-strip. A. H. Gilmore, Seattle, Wash.

1,024,329. Sanitary attachment for bathtubs. A. L. Grow, Beaumont, Kan.

1,024,260. Spacing and supporting device for reinforcing bars. H. H. Hickman, assor. to Corrugated Bar Co., St. Louis, Mo.

1,023,938. Window construction. Thos. H. Kane, assor. Trussed Concrete Steel Co., Detroit, Mich.

1,023,950. Sliding door track and cap. M. H. McNamara, Chicago, Ill.

1,024,420. Store front construction. V. Ross, Kansas City, Mo.

1,024,479. Night latch. H. G. Voight, New Britain, Conn.

1,024,465. Door check cushion stop. H. G. Voight, assor. Russel & Erwin Mfg. Co., New Britain, Conn.

1,024,466. Lock. H. G. Voight, assor. Russel & Erwin Mfg. Co., New Britain, Conn.

1,024,467. Lock. H. G. Voight and N. B. Hurd, assor. Russel & Erwin Mfg. Co., New Britain, Conn.

1,024,549. Ornamental prepared roofing. M. B. Becker, Chicago, Ill.

1,024,550. Prepared roofing. M. B. Becker, Chicago, Ill.

1,024,852. Reinforced concrete structure. Homberg, assor. one-half to A. G. Leonard, Chicago, Ill.

1,024,780. Sash holder and lock. Wm. M. Hotchkiss, New Rockford, N. D.

1,024,603. Door locking means. Fred Schmidgall, Cincinnati, Ohio.

1,024,808. Roof. H. Schwartz, Vienna, Austria-Hungary.

1,025,023. Metallic door. Chas. M. Sinclair, Chicago, Ill.

1,025,036. Concrete building. C. A. P. Turner, Minneapolis, Minn.

1,025,041. Ferro-concrete ribbed ceiling. J. H. A. Wrissenberg, assor. Gebruder Boiken, Eisenbeton - Hohldecken - Patente "System Wrissenberg," Bremen, Germany.

1,025,364. Ventilator for water closets. K. S. Blanchard, Brooklyn, N. Y.

1,025,688. Mfg. of metal casements. F. H. Crittali, Braintree, England.

1,025,740. Closet and urinal flusher. B. E. Dorman, assor. one-half to W. Coyle, Moline, Ill.

1,025,617. Door hanger. P. M. Elliott, Chicago, Ill.

TRADEMARKS.

86,141. Artificial building stones. Kingstone Ornamental & Construction Co., Los Angeles, Cal.

86,200. Paper roofing. Atlantic Coast Hardware Co., Boston, Mass.

86,268. Certain construction materials. Barrett Mfg. Co., New York City.

86,299. Building, sheathing, roofing, etc., papers. Hydrex Felt & Engineering Co., Portland, Me., New York City, and Rahway, N. J.

Building Material Price List

Revised to Date.

*Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red Cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

	Seattle, Wash., Corrected by F. T. Bradley.	Chicago, Corrected by J.H. Touchstone.	Omaha, Neb., Corrected by I. P. Hicks.	Southern Ontario, Corrected by F. O. Frantz.
Dimensions, Fir Lumber—	M ft. BM	M ft. BM S 2 S	M ft. BM S 2 S	M ft. BM S 2 S
2"x4" to 8" up to 16', No. 1	$11.00	$20.00	yp $26.00	h $24.00
2"x4" to 8" up to 16', No. 2		18.00	24.00	22.00
2"x4" to 8" 18 and 20', No. 1		21.05	27.00	26.00
2"x10" up to 16', No. 1	12.00	20.50	28.00	24.00
2"x12" up to 16', No. 1		21.50	30.00	25.00
2"x14" up to 16', No. 1	12.50	*	*	26.00
Each 2 ft. over 20 ft., add per M		1.00	1.00	2.00
Select stock as above, add per M	6.00	5.00	*	*
Exterior Finish, Etc.—		M ft. BM D 4 S	M ft. BM D 4 S	M ft. BM D 4 S
1"x3" to 1"x8", No. 1	30.00	yp $32.00	yp $45.00	wp $35.00
1"x16", No. 1	39.00	32.00	43.00	40.00
1"x12", No. 1	35.00	37.00	46.00	42.00
1¼"x3" to 1¼"x12", No. 1		45.00	48.00	45.00
1½" and 2" same as above		42.00	48.00	42.00
1" drop siding, No. 1	25.00	24.00	30.00	30.00
½" lap siding, No. 1 cedar	25.00	*	rdw 30.00	30.00
Enclosing and Fence Boards—		M ft. BM S 1 S	M ft. BM S 1 S	M ft. BM S 1 S
1"x4" to 1"x8", No. 1		yp $23.00	yp $25.00	wp $30.00
1"x8" to 1"x12", No. 1	11.00	23.00	24.00	h 24.00
1"x16", No. 1		*	24.00	24.00
1"x16", No. 2	15.00	*	22.00	22.00
Interior Finish, Flooring, Ceiling, Etc.—		M ft. BM D S	M ft. BM D 4 S	M ft. BM D 4 S
½"x⅞", T. & G. Flooring, No. 1	30.00	yp $26.50	yp $38.00	wp $40.00
½", T. & G. Flooring, No. 2	27.00	*	34.00	wp 30.00
Ceiling per M	25.00	1.00	2.00	1.00
Partition per M	30.00	2.00	2.00	2.00
⅝"x4" Ceiling No 1	17.00	22.00	30.00	np 30.00
		100 ft. run	100 ft. run	100 ft. run
4¼" Moulded Casing	.02	yp $1.52	yp $2.00	wp $2.00
4¾" Moulded Casing	.02½	1.68	2.50	2.50
7¼" Moulded Base	.03	2.53	3.50	4.50
½"x9¼" Moulded Base		3.75	4.00	6.00
1½"x4½" Moulded Window Stool	.02½	2.12	3.00	4.00
Miscellaneous List—		Per M	Per M	Per M
Shingles, No. 1		rc $3.30	$4.00	bc rc $3.75
Shingles, No. 2		3.35	3.75	*
Shingles, fancy		W. C.	4.50	6.00
Lath, 4 ft., No. 1		yp 3.60	y 5.50	wp 5.00
Lath, 4 ft., No. 2		2.75	5.00	s 3.75
Pickets, 1"x3"x4' 6", dressed		35.00	30.00	*
Pickets, 1"x3"x4' 6", rough		*	*	*
		Piece	Piece	Piece
6"x8' Post split		Cdr $0.13	Cdr $0.25	*
8"x8' Post split		.17	.30	*
8"x8' Post whole		.66	.40	Cdr $0.30
6"x8' Post whole		.25	.35	.25
Hardware List—		Cw.	Cwt.	Cwt.
Nails, wire, common		$2.25	$3.00	$2.85
Nails, cut, common		2.10	*	3.00
Nails, wire, fine finishing		2.65	3.50	4.00
Sash Weights, cast iron		1.60	1.50	2.25
Tarred Felt Paper, best 2-ply		Roll $1.00	Roll $1.00	Roll *
Tarred Felt Paper, 3-ply			1.25	*
Red Rosin, Atlas brand			.90	$0.50
Red Rosin, durable brand			.75	.60
Black Neponset			*	2.50
Masons' Supplies—		Per M	Per M	Per M
Brick, blue, at kilns		*	*	*
Brick, blue, at kilns, No.		*	*	*
Brick, blue, at kilns, No. 2		$7.50	*	
Brick, white, delivered, face		7.00	*	*
Brick, red, delivered, backing		7.00	7.50	*
Brick, delivered, dry pressed		18.00	18.00	$17.00
Brick, vitrified, dry pressed		*	24.00	*
Lime, best gray		bbl. $1.30	bbl. $1.25	bbl. *
Lime, best white		1.40	1.25	1.80
Cement, Portland		.95	1.85	*
Plaster, calcined		2.40	1.80	bbl. $2.50
Hair, 8 lb. per bush		.25	.25	*

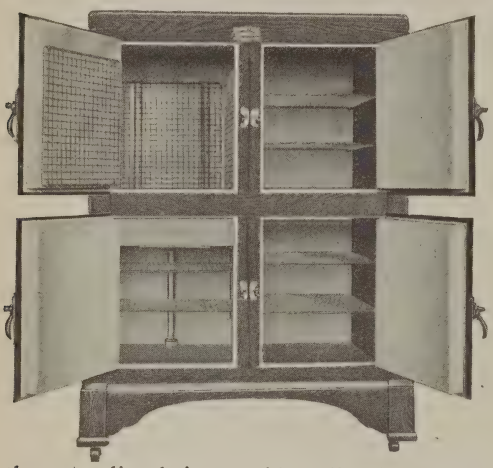
NOTE—While these figures are approximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

Trade Review

OUTSIDE ICING.

The inconvenience of having the iceman tramp through the kitchen to a stationary refrigerator has caused the installation in many homes of a refrigerator with a door opening to the outside so that the ice can be put in without entering the house and without regard to whether the family are at home or not.

There is also the advantage that an arrangement of this kind prevents milk bottles and

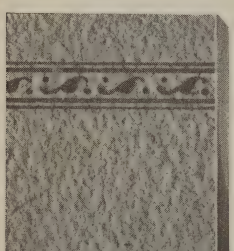


other supplies being accidentally tipped over or damaged, such as often occurs in the old style refrigerators.

We show on this page a cut of a refrigerator designed for outside icing. This style is made by the Herrick Refrigerating Co., Waterloo, Iowa, and is one of the many models made by this company. A fuller description of this refrigerator is found in their recent catalogue, which we understand is sent free to our readers.

BEAVER BOARD.

The remarkable success of Beaver Board is due not alone to the fact that there is a demand for a wood fiber board for walls and ceilings, but to the fact that the Beaver Company has been able to make a product which resists changes in temperature and other weather conditions without deterioration, warping or other bad effects.



Sample of Beaver Board.

The Beaver Board Company have made many experiments and conducted exhaustive tests with various materials which could enter in to the manufacture of a board of this character, and the present forms in which Beaver Board is obtained are the results of these experiments and tests.

Beaver Board is not only independent of the weather as regards results, but it is also independent of the weather as regards installation. No weather is too cold nor no day too damp to permit Beaver Board being put up with perfect safety, as there is nothing to freeze or be damaged.

There are many places where Beaver Board can be used to advantage in so-called temporary structures, such as summer camps and bungalows which are occupied only a portion of the year, and in portable cottages where the restive camper spends each summer in a different locality. Beaver Board in these places has ideal qualities, as it is light, and suffers no damage from being taken down, shipped and again set up where required. At the same time the surface produced is as level and plain as the best job of plastering.

Hall Finished in Beaver Board.

One of the latest Beaver products is Beaver Tile, which is made in the same general form as Beaver Board, but is blocked off to represent the tile commonly used in bath rooms, kitchens, lavatories, laundries, etc. When properly enameled, the surface is practically waterproof and can easily be kept clean.

The circulars which the Beaver Company, 448 Beaver road, Buffalo, N. Y., are sending out contain in great detail instructions for measuring, ordering, putting up and finishing the various forms of Beaver Board. These catalogues, as well as the samples of Beaver Board and Beaver Tile, should be in the files of every up-to-date contractor.

BUILDERS' LEVELS.

The Bostrom-Brady Mfg. Co., 126 Madison Ave., Atlanta, Ga., advises us that they have received a large number of orders from NATIONAL BUILDER readers for their levels. These customers report that they are perfectly satisfied with the instrument on account of its simplicity, accuracy, efficiency, compactness and durability.

The essential features of the Bostrom-Brady levels are the ease with which they can be adjusted, and their accuracy. For all building purposes as good results can be obtained as with the high-priced engineers' instruments.

$2.50 for a Simonds Saw

That isn't too much to pay for a first class saw. Manufacturing cost and cost of material fix the price of such a saw. Simonds Steel is the most uniform and finely textured edge-holding steel that we turn out of our Simonds Lockport Steel Mill. The handle is selected applewood, nicely carved and highly polished.

To grind the blade to an accurate and true taper from cutting edge to back and from heel to point; to properly form and file the teeth; to give the blade a finishing touch of high polish and etch the name "Simonds" on it—are matters that require workmen of experience and skill. With a saw made by such men you can do your best work.

The saw that hangs right, doesn't bind in the cut, takes no more kerf than necessary, cuts evenly all along its edge, and holds its cutting edge for an extra long time between filings, is the economical Saw for you to buy.

Such a Simonds Saw you can get in either Cross-Cut or Rip style tooth, any standard number of points per inch, in 26" length, for $2.50; other lengths corresponding prices.

We sell direct only where Simonds Saws are not carried in stock by local Hardware Dealers.

Each Simonds Saw is packed in a separate case. The case is a neat, convenient way to carry the Saw, and is often kept by Carpenters for just this purpose.

If you have not received a copy of Simonds Guide for Carpenters, write us and we will send one free. Are you buying Simonds Saws from your local dealer?

Simonds Manufacturing Company

Fitchburg, Mass.
New York City
Portland, Ore.
Vancouver, B. C.
Chicago, Ill.
New Orleans, La.
San Francisco, Cal.
Lockport, N. Y.
Montreal, Que.
Seattle, Wash.
London, Eng.
St. John, N. B.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

GOOD BUSINESS FOR THE ARCHITECT AND BUILDER

IT pays the Architect to **write** Green Label Varnishes **into the contract.** It pays the Contractor and Builder to **make sure** that genuine Glidden quality goes on the **job.**

Not **"or equivalent"**—for there is **no** equivalent.

It's this matter of proper finishing—of beautiful permanent protection of the woodwork and floors that insures the future satisfaction of the owner—and reflects **lasting** credit on the man who wrote the specifications and the man who carried them out.

So it is good business to go by the Green Label—**always.**

The Glidden name has stood for **quality** varnish for nearly half a century. We made our standard the highest—and **kept** it there.

We do not know "all there is to know" about Varnish—never expect to. But we've been busy learning all the time—**Perfecting Good** Methods, supplanting **Good** materials with **Better** ones, which we search the world to secure, regardless of cost—and training here, under Glidden guidance, a corps of expert varnish makers and chemists—every man of them a specialist—the greatest varnish organization in America.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

GLIDDEN'S GREEN LABEL

Varnishes of Vitality

re full of life, elasticity, durability. The Glidden way of per-ect blending and refining—of long time ageing—means a roduct of perfect **Uniformity.** Glidden Varnishes dry just uickly enough but not too quickly, and set without dust. hey bring out **all** of the natural beauty of the wood. They re proof against **Hard Knocks** and **Heel Nails.**

There's Quality in Every Drop

Five splendid specialties—each grade has its pecial purpose:

M. P. Durable Exterior - -	$4.00 Per Gallon
M. P. Durable Interior - -	3.00 Per Gallon
M. P. Durable Floor - - -	3.00 Per Gallon
Velvet White Enamel - -	5.00 Per Gallon
Superior White Enamel -	5.00 Per Gallon

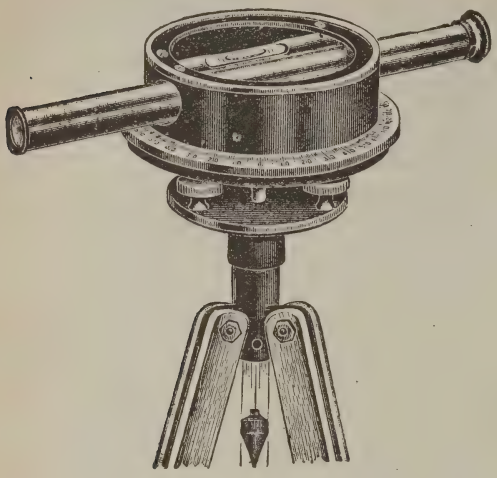
The Glidden Varnish Co.

Factories: CLEVELAND, OHIO TORONTO, CANADA

Branches: New York Chicago London

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The detailed description of Bostrom's No. 3 and No. 4 builders' levels fully describes



these instruments, as well as giving a number of letters from satisfied customers.

THE LITTLE WONDER CONCRETE MIXER.

Within the past couple of years a small concrete mixer called the Little Wonder has appeared, which has almost revolutionized the small concrete job business. The Little Wonder applies for the first time in the history of concrete mixers the principle of the tilting drum batch mixer, which, as every concrete man knows, is the only really thorough, scientific method of mixing concrete, and at the same time doing it quickly and economically.

To demonstrate the difference in the cost of concrete mixing by hand and the Little Wonder mixer, a comparison based on the average wage of $3 per day for labor, shows that by hand work, eight men will mix and place on the average job 20 cubic yards of concrete per day, which at $24 is $1.20 per cubic yard of concrete. With a Little Wonder, six men will mix and place 25 cubic yards of concrete per day, and at the same wage, and including gasoline and lubricating oil (25 cents), the concrete cost only 73 cents per cubic yard, which on 25 cubic yards means a profit of $11.75 per day over hand work, to say nothing of the hard labor also saved.

It will be seen from the above that the concrete contractor can make such a machine as this pay for itself in a very short time.

The great success of the Little Wonder, and the enthusiasm with which is has been greeted throughout the country, is largely due to the extreme simplicity and the perfection of the mixing. Heretofore, the complicated character of all machines of this type has operated severely against their popularity. A man does not have to be a machinist nor does he have to hire one to operate the Little

PERFECT MITRES

are always made with the

LANGDON ACME MITRE BOX

When supplied with back saws, fitted by ourselves, they are warranted to do perfect work.

Quickly Adjusted for Any Angle. Some of the advantages over older models are: In longer guides, which hold the saw steadier. These guides are provided with elevators to hold the saw stationary when desired above the work.

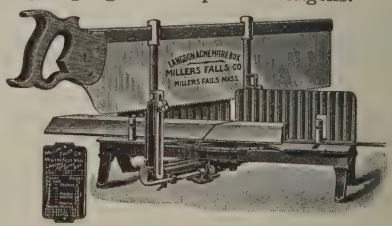
In a graduated arc showing the various angles commonly used.

In supporting guides to hold the work in place.

In an appliance for quicker adjustment of extension lever.

In a length gauge for duplicate lengths.

These boxes are made in three sizes and put up with varying sizes of saws, ranging from 22″x4″ to 30″x5″.



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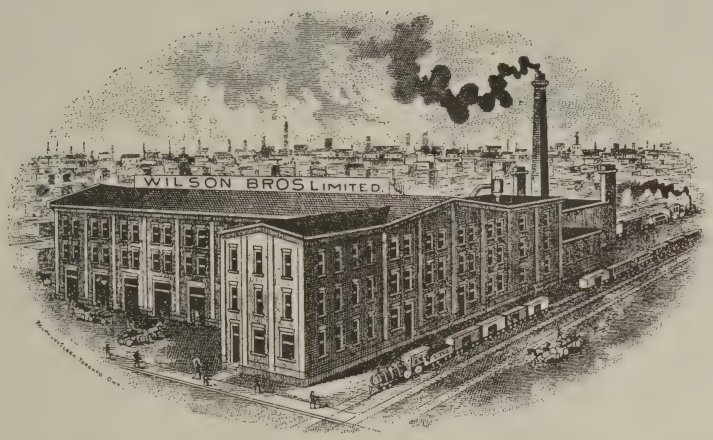
For Canadian Readers

of the National Builder—Only



This illustration does not show you the largest factory in the world. But it does show you a plant that is unusually well equipped—where only experienced workmen are employed—where the highest grade materials are used—The home of

Wilson Bros., Limited, Flooring

The fact that we are one of the oldest and largest manufacturers of **Maple Flooring** in this country should give you confidence to specify and buy not only **Wilson Bros., Limited, Maple Flooring,** but also **our Beech, Birch** and **Oak Flooring. Wilson Bros., Limited, Flooring** means a carefully kiln dried and manufactured article. It is straightened, hollow-backed, bored, end matched, steel polished and bundled.

BESIDES OUR FLOORING WE SPECIALIZE ON

Veneered Doors and Hardwood Interior Finish

TO DETAIL—WE ALSO MANUFACTURE DOORS, SASH AND PINE FINISH

CANADIAN READERS OF THE NATIONAL BUILDER

We have the right kind of plant, material and workmen—we are located in your own country, where we can give you the quickest shipments and best prices considering the high quality of our goods—so let us become acquainted. You can make money by specifying **Wilson Bros., Limited, Flooring and Interior Finish**—besides pleasing your customers—so write us now—we want to figure with you on your next job.

Wilson Bros., Limited

First Street **Collingwood, Ontario**

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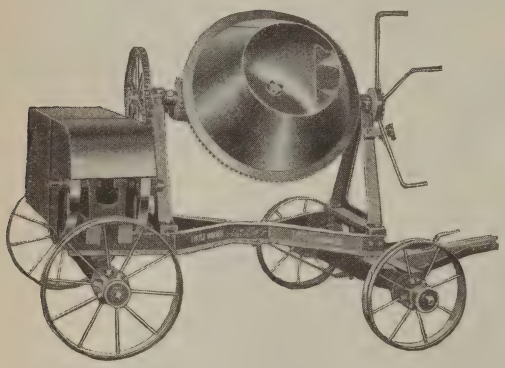
NAT. BUILDER

Wonder. There is nothing about the machine to get out of order. It eliminates small parts and "Shake-looses" in general, does away with cumbersome hoppers and intricate mechanism and reduces concrete mixing to



its simplest terms. There are no movable parts whatever in the drum, and this is so evenly balanced that it tilts from one side to the other without effort, so that a boy can handle it. The machine is charged on one side and discharges on the other directly into wheelbarrows or forms, and without stopping the engine.

The gasoline engine is a first-class one, consuming only about one and a half gallons of gasoline per day. The total cost of gasoline and lubricating oil scarcely exceeds 25 cents per day. When not needed for the mixer, the engine can be detached and used for other purposes. The gasoline engine is covered with a neat steel housing, which, while easily removable, fully protects the engine and is an important factor in its life.

The mixer and engine are mounted on steel trucks and wheels with tires 3 inches wide, the front wheels being 20 inches in diameter, and the rear wheels 24 inches. U bolts are used to fasten the frame to the axle, thus avoiding the weakening effect of holes. The weight of the machine on trucks with power is 1,250 pounds; on trucks without power, 870 pounds, on steel skids with power, 980 pounds; on steel skids without power, 600 pounds.

It will be seen that a valuable feature of the Little Wonder is the ease with which it can be moved about from one job to another, particularly in sidewalk work, foundations, etc. This is of great value. But the Little Wonder runs the whole gamut of concrete work—fences, hitching posts, water troughs, tanks, drives, cisterns, ice houses, etc.

The capacity of the machine is a batch of from 3 to 4 cubic feet of concrete per minute, thoroughly and uniformly mixed; at 25 cents per day for gasoline—this makes the concrete cost only about 1 cent per cubic yard.

In efficiency and comparative capacity, the Little Wonder is equal to the largest batch mixers, and is recognized by eminent engineers and contractors as marking a new mile stone in the development in this class of machinery. It sets the standard of money-earning capacity by which all small mixers will in future be judged. The Little Wonder has been tested in all sorts of work and under all conditions, and never found wanting.

The Little Wonder mixer is made by the Waterloo Cement Machinery Corp., 111 Vinton street, Waterloo, Iowa, and the catalogue which they are sending to inquiries is one of interest, not only as a description of the machine, but for the various other material which it contains.

A PLAN CONTEST.

The Hewitt-Lea-Funck Company, 629 1st Ave., Seattle, Wash., have in preparation a plan book, which will be extremely useful to the contractor and builder. To secure representative plans from all sections of the country, they are offering the valuable prize of a car of lumber, practically all the lumber required to build the house from the prize plans.

This contest is free to the readers of the NATIONAL BUILDER, and should bring in a large number of plans. We know that our readers have been building prize houses, for they have built many from the designs shown in the NATIONAL BUILDER, and we know that many of our readers are competent to design prize houses.

The result of this world-wide contest will be read with great interest, and we will be pleased should one of our readers land the prize. To make the contest more interesting, the Hewitt-Lea-Finick Company will give a large discount on the lumber for a large number of additional plans. This should make it very interesting to our large list of planners and builders. Read this announcement on another page and draw the plans of the best house you have built. The time limit which has been set means that the pencils must get busy at once.

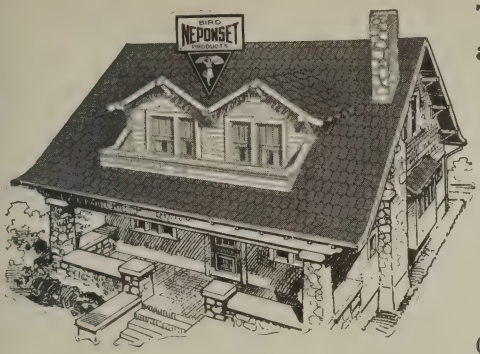
We understand that those who do not send in plans, but who want the book when published, will be placed on the list and receive the book free, provided THE NATIONAL BUILDER is mentioned.

SANITARY BASEMENTS.

It is the purpose of this article to draw to the attention of the reader a subject to which the average home owner or home builder, devotes very little time in serious consideration.

Volumes have been written on subjects dealing with the various features of home building, but on things that have to do directly with that portion above the ground—the arrangements of rooms, the distribution and control of lights, the interior finish, vacuum cleaners, model bath rooms and many other important and attractive topics—but how much space has been devoted to a consideration of improvement of basement conditions?

Of course a certain amount of preliminary thought is given this problem such as the type of heater, the best location for it, the arrangement of coal bins, vegetable rooms, laundry, etc., and as stated above, this is very important and necessary, but should the con-



The Work of Applying is Quicker and Easier When You Use

NEPONSET WATERPROOF Building Papers

Ordinary rosin sized paper soon absorbs moisture, leaving the house unprotected against dampness and cold. Soon the wetting and drying out causes the paper to tear around the nail holes. Often, it slips down between the boarding and siding. Then the house is without protection against draughts.

NEPONSET Building Papers are absolutely waterproof. They keep out dampness and cold as long as the house stands—save a ton of coal each winter. Any home owner will gladly pay $8.00 or $10.00 to have his home protected with **NEPONSET if** you tell him why.

Write for the NEPONSET proposition.

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"TITELOCK" METAL SHINGLES

Fire, Water and Lightning Proof

Finest in Appearance
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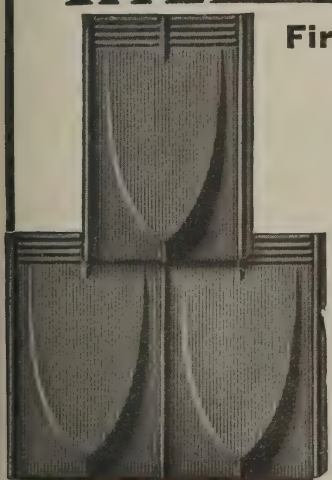
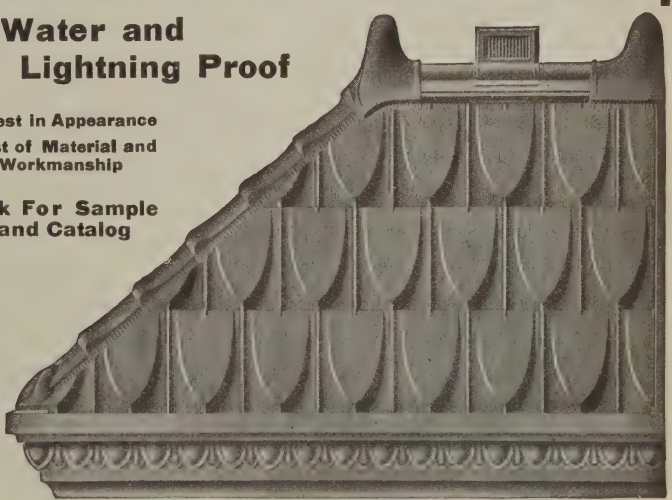
Ask For Sample and Catalog



STYLE B. Showing Method of Laying.



STYLE B. Showing Ridge and Hip Finish.

MILWAUKEE CORRUGATING CO.

Kansas City, Mo. Milwaukee, Wis.

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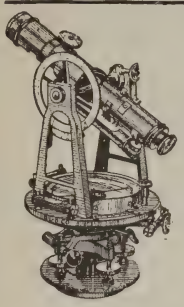
Are You Satisfied With Your Work?



If not use a **Beckmann** Instrument and you will have **Satisfaction** as well as **Confidence** in your work.

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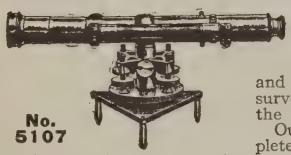

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We manufacture every requisite of the engineer for field and office work and build a special type of surveying instruments for the architect and builder. Our catalogue lists a complete stock of drawing, mathematical and surveying instruments and measuring tapes.

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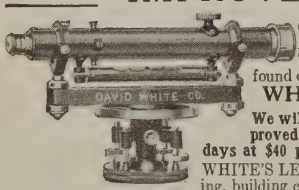


Combines Simplicity with Accuracy and Durability. Three features to be found only in

WHITE'S LEVEL

We will ship you this $45 Improved Level for the next 30 days at $40 prepaid to your address. WHITE'S LEVEL is the best for grading, building concrete sidewalks, laying out buildings, leveling, etc. Directions with each level. Examine it upon receipt and if found other than we represent it, return it to us and your money will be refunded.

Write for catalog and complete price list.

DAVID WHITE CO., 421 E. Water St. MILWAUKEE, WIS.

YOU CAN'T AFFORD TO BUILD

without a **LEVEL**, and

YOU CAN'T AFFORD TO BUY

without investigating the advantages of the

"Sterling" Convertible Level

Write **TODAY** for Catalogue and our **Special Offer.**

ISZARD-WARREN CO., INC.

136 N. TWELFTH ST., PHILADELPHIA, U. S. A.

sideration cease when these factors have been determined upon?

The old adage that "Cleanliness is next to Godliness," can apply here just as strongly as in our persons, but while many of us may be particular to keep our surrounding in a healthful condition, yet among a large portion of the average dwellings can be found neglected basements. If our neighbors were entertained in that section of the home, it is reasonable to assume that a good deal of pains would be exercised to keep it neat and attractive, but unfortunately the basement is the least used and consequently the least looked after.

Under what circumstances do unhealthful conditions thrive and grow? Where there is neglect and lack of proper attention to the source of the trouble. Why then, is the basement not the natural breeding ground for trouble of this character. As we go into the basement, the first thing which is liable to meet the gaze is an untidy floor which is directly traceable to three things, piles of wood, coal dust, and ashes, neither one of which sounds very terrifying, but let us give a little thought to why they may be a subject of importance.

It is necessary in most homes, to go into the basement three or four times a day, to get coal, wood, vegetables, or some other substance in common use. To secure these one must walk through the dust and dirt on the cement floor and in so doing, there is a portion which clings to the shoes and which may be carried to the upper part of the house and into the living rooms. This is untidy, to say the least. The coal dust is pulverized carbon, which, under pressure of the person's weight and the movement of the foot acts as an abrasive to cut out floor finish and carpet or rug fibres. That part of the floor leading directly to the cellar door will almost always show signs of wear and defacement not seen so clearly elsewhere.

Vegetables and fruit will decay and wherever there is decayed matter, there we can look for a serious source of trouble in disease breeding germs such as ptomaine poisoning, typhoid fever and the like. These bacteria are so small that the slightest current of air will dislodge them and cause their gradual spread. Suppose there is ash dust convenient on which they can lodge. This dust is capable of being very minutely pulverized and the tiny flakes are readily disturbed by air currents caused by draughts, moving persons, sweeping, etc. What occurs? These small flakes on which the dreaded germs are peacefully resting, are caught up and carried along with the circulation of air, and directly acting as a conveyor for the very small, but exceedingly dangerous "Bugs." The ash dust finds its way through the house, settles on carpets, furniture, drapery and food, where, soon or late, he occupants are bound to inhale them into their system.

Authorities on the subject declare that ash piles, refuse, etc., are the breeding grounds for flies and the danger from this pest is now a matter of common knowledge, and yet intel-

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Why the Architect and Builder Specify Alabastine

Because he wants to give his clients the best and he knows Alabastine is best. He knows that not only for the home, but for churches, school houses, opera houses and all public buildings, Alabastine is the logical and suitable material to use.

Why the Property Owner Wants Alabastine

Because he knows from his personal experience or the experience of friends that Alabastine is the most artistic and dependable material that he can use on his walls.

He knows that Alabastine in the hands of a capable workman will enable him to carry out any individual decorative idea, harmonize the colors with rugs, draperies, etc., and give him an original and truly artistic effect.

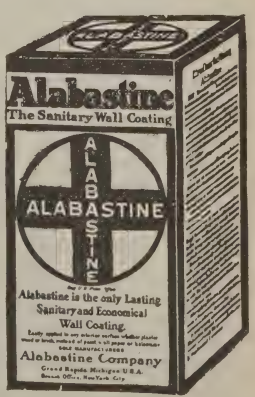
Very few people can afford to have special designs of paper made for their rooms, but any one can get an absolutely original design in Alabastine decorating.

Why the Large City Decorators Use Alabastine

Because they know that if Michael Angelo were on earth today carrying out his famous frescoes, he could not procure or produce a better water color medium for his work than Alabastine. So fine is Alabastine in texture that water color artists are able to take the regular packages and produce beautiful floral and landscape effects. The decorator wishes to please his client by giving him what he desires and that material with which he can produce the best effects, so he uses and recommends Alabastine.

Why the Small-Town Painter Is a Friend of Alabastine

If a customer wants her rooms done in water color, she wants them done in Alabastine. Samples are furnished the painter showing a complete line of beautiful color effects and miniature stencils from which she can select the exact colorings and decorative effects she may desire and the painter knows exactly how to produce and carry it out. He knows also that he can get any kind of special help by writing the Alabastine Company.



We also manufacture a special interior cold water paint sold in barrels for factories, warehouses, garages, etc. Used in immense quantities, always with satisfaction as to quality and price.

Alabastine Company

735 N. B. Grandville Road **Grand Rapids, Mich.**

Desk 35 N. B., 105 Water Street, New York City

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NAT. BUILDER

ligent people will allow cans and barrels filled with ashes and often times containing garbage, to sit exposed in their cellar, for days at a time. It isn't necessary to predict what is liable to follow.

In going over the preceding, there does not appear to be any statements made which can be construed as exaggeration, and it is now intended to point out a way to improve this state of affairs.

Painting white, or calsomining the walls has a very pleasing effect. White symbolizes cleanliness, and it is easy to detect cobwebs, dust and dirt against a white background. White walls and ceilings reflect light and help to eliminate dark corners, and unhealthy things have a natural tendency to shun the light places.

Our most important consideration lies in the ashes with its resultant dust and trail of trouble.

It is not our contention that the ashes can be done away with; that would be a state of affairs too near the realization of an ideal, but there is no question of a doubt, but that, as far as mechanical means can make for this condition, we have such a device now available for use wherever a heating plant of moderate size is in operation.

This apparatus will warrant a brief description in order that the reader can get an idea of its construction. A pit approximately two and one-half feet deep and from five to six feet in diameter, is excavated in front of, and so that about a foot of it projects beneath the heater, the walls of this pit being of concrete.

Assembled in the pit is a heavy cast iron frame, revolving on a pedestal bearing, and carrying a series of specially constructed cans, so designed as to form practically one large can. Over the whole mechanism are placed smooth cast iron plates which have carefully constructed joints so that when the installation is complete, they are practically air tight. One of the cover plates is removable, to permit the filled cans being taken out and emptied.

To care for ashes, by this device, the draughts are turned on, the ash pit door opened, and the ashes drawn forward to an opening just inside the door, and through which the ashes drop into a can beneath. When one can is filled, a socket wrench, attachable to the center shaft on the top of the shaft, has a number corresponding to each can, and when a number coincides with an arrow on the center plate, a can is in the correct position to receive the ashes.

The dust which is freed by drawing the ashes forward is immediately carried back by the natural draught created when the door is open, thus preventing its escape into the room.

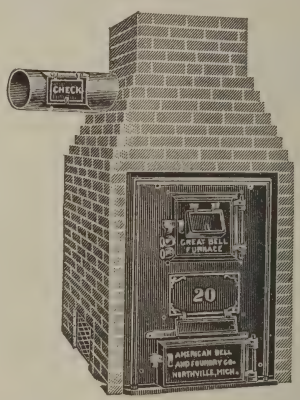
The cans provide a capacity for accumulation of from six to ten weeks, depending on the size of the installation, the ash receiver being made in two sizes, eight and twelve cans.

It is only reasonable to assume that in accordance with modern tendencies toward complete sanitation, the people will soon realize and plan their basements with careful forethought, making provision for the proper care and disposal of ashes and refuse, and it is to be hoped that a full realization of the need for doing this will come speedily.

The W. M. Sharp Company, 301 Park avenue, Binghamton, N. Y., are the manufacturers of this useful appliance and wish to have the advantages of their apparatus thoroughly understood by every contractor. A line to them will bring full information and their special summer prices to NATIONAL BUILDER readers.

THE GREAT BELL FURNACE.

Catalogue No. 15 of the American Bell & Foundry Co., Northville, Mich., contains very complete descriptions of the furnaces made by this company, as well as register patterns, boxes, etc., required in high-grade furnace work.



One of the patterns made by this company is known as their No. 20. This furnace is intended to be brick set, as shown in the cut, and the manufacturers claim that it requires from twenty to thirty percent less fuel than any other system known for the space heated, and that it is possible to keep the temperature extremely uniform.

Another style is known as their No. 35, and is intended for stores and dwellings, which were not originally designed for a furnace installation. This furnace is extremely simple to set up and the manufacturers claim that it can be set up ready for use in as short a time as one can black and set up a base burner.

The various features of excellence in design and construction of these furnaces are well described in the circulars which the company is sending out to NATIONAL BUILDER inquiries. It is suggested that contractors should obtain their catalogue, prices, etc., in order that they may be prepared to talk intelligently with their clients when the subject of heating is brought up.

ORR & LOCKETT HARDWARE Co
Established 1872

¶ Most contractors and builders doing business in Chicago and vicinity know that they save time, trouble and money by sending us their orders for

Builders' Hardware

¶ But there are others who do not realize what an advantage it is to have the benefit of our service, forty years of experience and tremendous buying power, and this advertisement is intended for them.

¶ In the first place we carry at all times the largest and most complete line of builders' hardware in the country, so we seldom have to hold up an order because something is "out of stock." And this huge assortment (including the well known brands), gives you the greatest possible choice of kinds and prices.

¶ We very seldom fill an order with the goods of any one manufacturer exclusively, but select those pieces which are acknowledged to be the leaders in each manufacturer's line. Thus the entire order contains only the highest grade articles—not a weak link anywhere.

¶ In packing our goods for shipment we sort and label each piece from the specifications so that the workmen on the job lose no time in handling. Any contractor will appreciate the great advantage of receiving his hardware in this shape.

Send us your plans or specifications so we may show you

ORR & LOCKETT HARDWARE Co
Established 1872
14-16 W. Randolph St. CHICAGO, ILL.

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CONCRETE FENCE POSTS.

The rapid deterioration in lumber at the surface of the ground, such as is found in fence posts, cribbing, curbing, etc., has led to the use of concrete and other forms of masonry for all work subjected to the ground moisture, as well as to the air close to the ground.

The rapid passing of the forests renders a new form of fence post imperative. The manufacture of cement has reached such a point that fence posts can now be built of concrete at about the same cost as wood. There is the added advantage that the concrete posts are made on the job when required, whereas the wood posts must be frequently shipped in from a distance and in quantities in excess of the temporary needs.

The Ohio Post Mold Company, 1041 Nicholas building, Toledo, Ohio, have for some time been manufacturing molds for making concrete fence posts. The recent improvements on their molds permits a large number of posts to be made at one time, and still the plant occupies only very small space.

So successful has these posts proven that many of the railroads and other corporations requiring large numbers of posts are now manufacturing them for themselves. This means that the right of way will be permanently protected and the public will be spared the sight of broken down posts, gaping holes in the fences, etc.

The Ohio Post Mold Company has prepared very complete literature regarding these molds or machines and will be glad to send them to contractors and others interested in a product of this character.

RUBBER SHINGLES.

Some of the best-known architects and building contractors today are giving preference to Rubber Shingles where handsome effect is desired.

These Rubber Shingles are a beautiful gray in color, similar in tone to slate, have all the beauty and attractiveness of other styles of roofing, without any of the drawbacks. As a consequence they are being preferred by the owners of expensive country and suburban homes—by the man who takes a pride in every detail of his building—those who aim for artistic effect, durability and economy—every one who appreciates a roof-covering of attractive appearance.

It has been found that this modern Rubber Shingle lends itself to any kind of trimming along the ridges, hips and angles of the roof, giving the home a comfortable, cozy look. Another reason why the Rubber Shingle is rapidly replacing all other styles of roofing is the fact it comes in a larger size than the ordinary wooden shingle, consequently can be put on quicker and with less labor cost.

And when it comes to the question of cost the Rubber Shingle has another decided advantage because it is being sold by the lumber, hardware or building material dealer at a price so low, as compared with prices asked for other roofing materials, that the owner of a building simply cannot afford to use anything else.

The General Roofing Mfg. Co., with its three big mills at York, Pa., Marseilles, Ill., and East St. Louis, Ill., are now producing what is known as Certain-teed Rubber Shingles. Instead of making a lot of extravagant claims for their product, they have settled the question of quality by guaranteeing their Certain-teed Rubber Shingles for a period of 15 years. This concern has just issued a new booklet, "How to Build for Less Money," which contains a lot of valuable roofing information. They will send it free to any reader of the National Builder who requests it.

HARDWARE SPECIALTIES.

The charm and convenience of our modern homes are not alone due to the fine finish which the painter and decorator is able to put upon our walls and woodwork. A large part of the comfort is due to the fact that the hardware harmonizes with the rest of the building. Where only serviceability is required, it was possible to hang doors on strap or tee hinges, and fit them with the old fashioned rim lock, but in the up-to-date building, whether a mansion or a camp in the woods, the manufacturers of special hardware have provided equipment for practically every imaginable purpose.

The basement window is now generally equipped with special hinges, which hold the window open when required. They are locked by catches made expressly for basement windows. The screens are hung on patent hangers, which permit the screen being readily swung out for clearing the window or removing it entirely for storage during the winter. All through the house we find the same general improvement in equipment.

The Diehl Novelty Company, Sheboygan, Wis., has an established reputation as manufacturers of builders' hardware specialties. Their catalogue is illustrated with a number of devices for saving time in installation and operation, while adding dignity and appearance to the building. This catalogue is of interest to every contractor and builder, as it shows him how the best hardware can be obtained, applied and used.

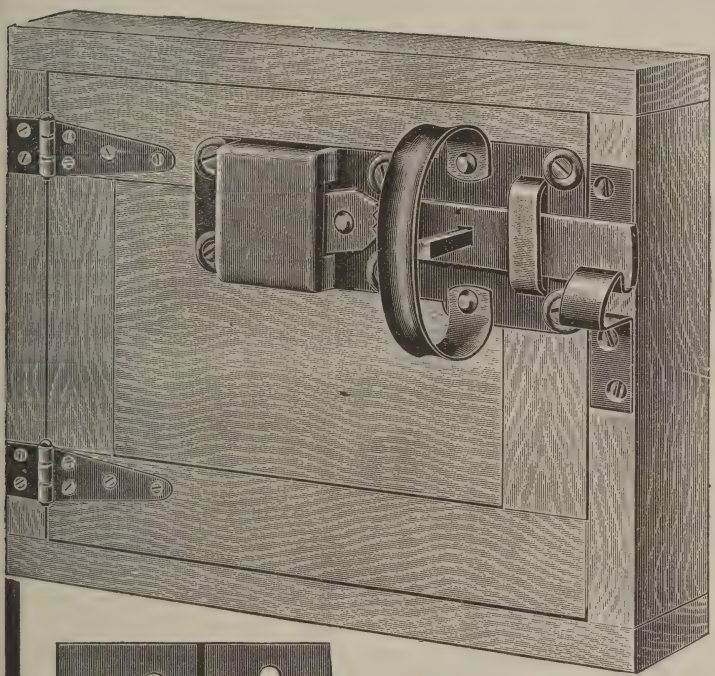
GRILLES, CABINET AND MILLWORK.

Catalogue No. 100 of Harty Bros. & Harty Co., Twenty-first place and Loomis street, Chicago, Ill., shows a selection of designs of sideboards, buffets, hall trees, colonnade openings and consoles, which have proved popular with their trade. Besides the stock patterns shown in their catalogue, this company pays particular attention to cabinet work from architect's details or from such suggestions as the contractor or builder may furnish.

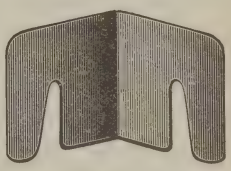
As much of their work is made up to order, they have perfected facilities for making minor changes in any of the designs shown, without material increase in cost.

BROTHER CARPENTER—ARE YOU SATISFIED

that you are using the right kind of goods? If not, then let us prove to you that you can save time and money by using ours, even at a higher price. This has been proven to others and it can be proven to you. Convince yourself regarding our goods and you'll be satisfied and satisfy your customers

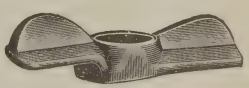


Diehl's All Steel Barn Door Latch No. 10

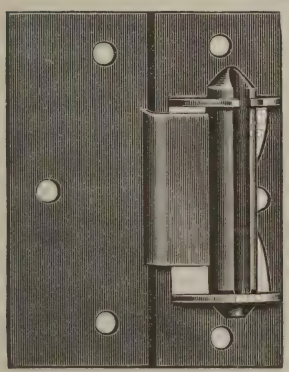


Diehl's Corner Braces for Porch Screening No. 55

Diehl's Couplings for Porch Screening No. 60



Diehl's Shank Button No. 25



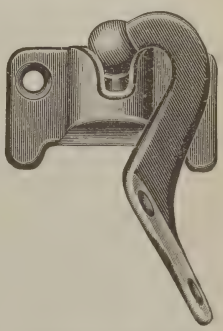
Diehl's Screen and Storm Door Hinge No. 20

We are the largest manufacturers of

Builders' Hardware Specialties

in the Northwest

Everything we make is right in workmanship, material and design.
Send for catalogue showing full line.
Specify and buy Diehl's every time.



Diehl's No. 1 Sash Hanger

DIEHL NOVELTY COMPANY

Sheboygan, Wisconsin

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Our Certified Plans Save Money *for* Contractors

Home of I. N. VANCE

The Gordon-Van Tine Company's Certified Plans for Houses, Bungalows and Cottages embody the very latest architectural ideas and enable the builder to save 25 to 50 per cent on the cost of the Special Millwork and other building material called for in the specifications. Each plan carries with it the Gordon-Van Tine Company's *certified estimate* on the actual cost of all of the material required. Thus the saving is *insured* at the very outset, eliminating any possibility of a bill of "extras," which invariably results where "theoretical" plans are employed.

Enthusiastic Endorsement From Builder of this House —Saved Over $300

Wellington, Missouri.
Gordon-Van Tine Co.,
Davenport, Iowa.

Dear Sirs: I have completed my house from your plan No. 129, and I want to tell you, gentlemen, I am more than pleased with your lumber in quality and quantity, both. I think I saved from $300 to $400 by buying the lumber from you instead of buying from the Lumber Trust.

I am ashamed to tell you that you sent enough extra lumber to build me an auto garage, but you certainly did, and when I get ready to build another house Gordon-Van Tine Company will get the order.

Yours truly, I. N. VANCE.

Saved Over 30%

Brighton, Iowa.
Gordon-Van Tine Co.,
Davenport, Iowa.

Dear Sirs: The two shipments of lumber were received from you in good order. The grades were much better than those furnished by our home dealer, saying nothing about the price, which was 30 per cent lower than the best figures we could get elsewhere.

The 2,000 feet of matched lumber which we ordered in the first car to make a car lot sold right on the ground, at what it cost us, without a bit of trouble. Yours truly,

DAY & BENNETT,
Builders and Contractors.

Widest Architectural Experience

These plans are the work of our own architects of wide experience, who devote their entire attention to designing high-class residences. They are specialists in this class of architecture, and over 100,000 splendid homes have been built from their plans. We know of no firm of architects who have had such experience and training.

Gordon-Van Tine Certified Plans

Houses — Cottages — Bungalows

Each Gordon-Van Tine Certified House Plan is accompanied by a set of specifications, complete in every detail. The specifications cover all items of construction, recommending the best materials to be used and the correct method of construction. Also an itemized List of Materials, so *specific* that nothing is left to chance.

GORDON-VAN TINE CO.

(195)

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

How Certified Plans

Cut Building Material Cost from 25 to 50 Per Cent

These plans are based on the bed-rock prices of Gordon-Van Tine Millwork and Lumber. They embody the newest architectural ideas. They call for a great deal of specially designed Millwork—beautiful Staircases, handsome Porches, special Art Windows and exclusive designs in Doors. Were these items made specially to your order at local planing mills, the cost would *double* or *treble* the prices at which the Gordon-Van Company will supply them.

Thousands of Special Designs in Millwork

For years the Gordon-Van Tine Company has been constantly adding to its regular stock the most popular *special designs* in Stair Material, Porch Material, Windows, Doors, Grilles and Colonnades, Mantels, Moldings and other finishing material. Each new item added to the line is made up in very large lots, which automatically brings the prices down to the lowest possible point.

For instance: A Staircase that formerly, when made specially to order, cost $90, is now sold for $23.93.

A Craftsman Door that, made *singly*, cost $15, is now made up in thousand lots and priced at $9.50.

A Beamed Ceiling for a room 14x18, that formerly cost $65 to $75, is now supplied from *regular* stock at $14.50.

Thus these Certified Plans secure to the home builder the *double advantage* of the very newest and most exclusive millwork designs and an actual saving in cost of from 50 to 75 per cent.

How to Secure the Book of Certified Plans

We have assembled in one beautiful volume the cream of our Certified Plans for Houses, Cottages and Bungalows. Over 50 designs, showing actual photographic reproductions of exteriors, together with complete floor plans and detailed descriptions.

Choose your plans from among these beautiful designs and insure a saving of at least half the cost on all the material required.

The only way to secure the saving is to build from these plans or to have our architectural bureau draw up *special plans*, specifying Gordon-Van Tine materials.

In writing for the Free Book of Certified Plans, *be sure to enclose 10 cents to cover postage and mailing.* Use the convenient coupon.

619 Federal Street **Davenport, Iowa**

Saved $150

Leeton, Mo.
Gordon-Van Tine Co., Davenport, Ia.

Kind Sirs: Got your draft today and had received and unloaded car of lumber yesterday. Lumber was satisfactory to all parties concerned—in fact, was better than we could have gotten anywhere in our home lumber yards. Will save about $150 all told. I will not be in the least afraid to take contracts, figuring your lumber as per grades ordered. Will say about receiving car of lumber that we had the confidence that we paid for same before opening car at all, and began loading the nine wagons waiting to be loaded. Had twelve men and every one expressed his opinion as above expectations. Left check at bank to cover all charges.

Thanking you for the low prices and highest grades, I beg to be ever a customer of Gordon-Van Tine.
W. E. SWEARINGEN, Contractor.

Saved Over $400

Eagle Grove, Ia.
Gordon-Van Tine Co., Davenport, Ia.

Dear Sirs: In buying two carloads of lumber of you, I find I have saved over $400. Besides this, I have bought one car of millwork for a large country residence. The millwork included five large fancy windows, which were away beyond our expectations in beauty and clearness of glass. I know of no better way to build a good house cheap, and at the same time give a blow to the lumber trust, than to buy of Gordon-Van Tine Co. My lumber always arrived at Eagle Grove within five days after receiving bill of shipment. My lumber, shingles and lath were better quality than we ever get at our home dealers. Wishing success to Gordon-Van Tine Co., I remain a customer,
IRA D. McVICKER.

Gordon-Van Tine Co.
619 Federal St.
Davenport, Iowa

Gentlemen:
I am going to build a .....and enclose 10c to cover postage and mailing on your

Book of Certified Plans

Lumber and Millwork for this 7-Room House, $1,038

Name.....

Town.....

Street..... *State*.....

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

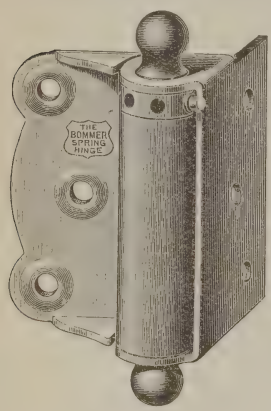
The catalogue contains, in addition to the trim mentioned above, their stock patterns of doors, mouldings, casings, etc.

The number of bungalows and cottages being finished in the Mission style has led them to make up a number of designs particularly adapted to this class of work, such as plate rails, panel strips, ceiling beams, etc.

This catalogue, which contains a great amount of information, can be had by any contractor or builder mentioning the National Builder.

HALF SURFACE SCREEN DOOR HINGE.

Bommer Brothers of Brooklyn, N. Y., are placing on the market a new line of screen door hinges, style No. 2,200, herewith illustrated. The principal features are the half surface and half mortise flanges making this hinge particularly desirable and a saver of time for the carpenter where the moulding on the door casing does not allow the use of the regular surface screen door hinge. It has adjustable tension, and the spring can be regulated after the hinge is applied to the door. The spring is entirely inclosed, and is made of the best oil-tempered steel wire. These hinges are made of wrought steel, bronze and brass in a variety of finishes, are handsome in design, possess unusual strength and durability, and are easy of adjustment and operation. The high quality by which Bommer Spring Hinges are well known is maintained.



THE GRAVITY LEVEL.

For generations carpenters and builders have been accustomed to the use of the spirit level. The use of a level of this character requires good judgment and a keen eye to distinguish exactly when the level line is reached. Everyone is familiar with the necessity for trying, reversing the level, etc., in order to be perfectly sure that the work is level.

The gravity level as manufactured by the U. S. Gravity Level Co., Dept. M., Nicholas building, Toledo, Ohio, overcomes many of the objections to the old form of level. Instead of a flickering bubble, a pointer on a dial indicates the degree of inclination and it is impossible to mistake the reading.

The gravity level is used by railroad builders, municipal engineers, surveyors, track foremen and others where it is desired to lay out work having a definite pitch, as well as by carpenters, masons, plumbers, etc., where a perfectly level line is required. When used as a plumb the same degree of accuracy is obtained and the gravity level has the added advantage of being capable of laying out splay and batered work without a pitch board.

The U. S. Gravity Level Co. manufactures these levels in a number of styles and sizes for various purposes. The circulars which they are sending out indicate a number of the uses to which the level is susceptible and the up-to-date contractor, builder and mechanic will readily see where the level is adaptable to his work.

ROOFING SLATE.

The first consideration in roofing is protection from the weather, but there is also the questions of permanence, durability, cost and appearance to be considered. Probably no substance has more all-around advantages than natural slate, and it is the standard by which other roofing materials are measured. As the various grades of slate can be obtained in a variety of colors, ornamentation in the roof is readily secured by a combination of the slates from the different quarries.

Mr. E. J. Johnson, 38 Park Row, New York, has been handling slate and slater's supplies for twenty-seven years, and controls a number of quarries, which insures his being able to deliver promptly the grade of slate required. In his latest catalogue he gives a great deal of information regarding methods of laying slate, quantities required, as well as the various grades and colors which he handles. The fact that there is such an earnest attempt to provide more fireproof roofs should lead contractors to obtain this catalogue and see how the cost of a slate roof compares to that of a good roof of other materials.

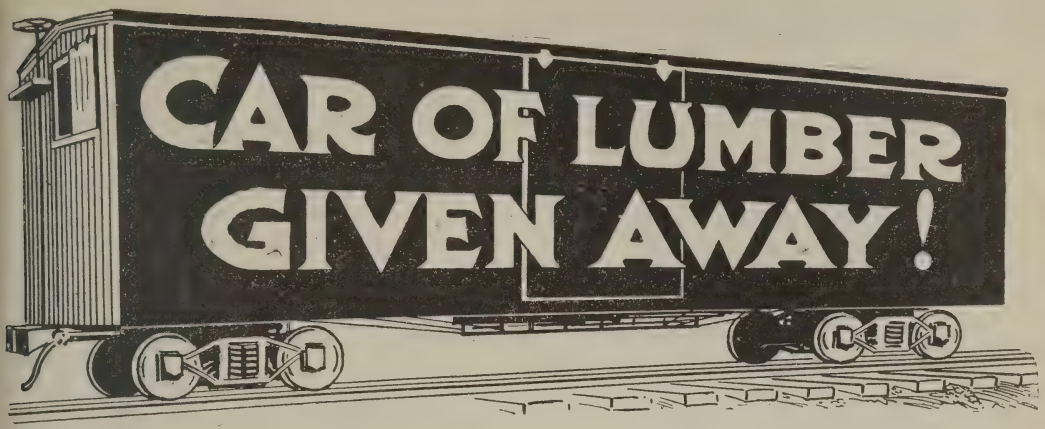
PRACTICAL AERONAUTICS.

The science of aviation has attracted in the last few years more attention than any one other subject.

Beginning with what seemed to be a visionary dream on the part of the Wright brothers, the world has seen the most spectacular advance along the line of dirrigibles and aeroplanes, and an advance in the design of motors and other apparatus connected with the machines. The interest which the public is taking in the acts of the numerous operators indicate that this will be a permanent field of interest, and that the next decade will see even more marvelous feats performed than have occurred in the past.

With their usual foresight, the American School of Correspondence, Drexel avenue and Fifty-eighth street, Chicago, Ill., have anticipated the demand for scientific information in this line and they have had prepared an authorative treatise on practical aeronautics by Chas. B. Hayward, with an introduction by Orville Wright.

We believe that those interested in the study of aeronautics can secure more information from this book than in any other way. The advance which the science is sure to make in the next three years should warrant everyone being posted on what is being done in this line.



To the Person Submitting the Best House Plan

Read the Conditions Carefully:

For the purpose of securing the best house plans of practical builders in all sections of the country, we will give away a whole carload of lumber—sufficient for the building of a house. The shipment will include common lumber, flooring, ceiling, siding, framing timbers, shingles—anything that the prize winner desires.

This extraordinary prize goes to the person who submits to us before August 1, the best plan for either a farm house or a town house.

Practically every builder in the country has some favorite plan. You undoubtedly have yours. Send it in. It may win the prize. It doesn't matter so much about the form in which it is submitted. Mail either a blueprint or a rough sketch, and if possible, send us a photograph of one of the houses you have built according to the plan. Accompany plans with list of material used in construction.

The prize car will be made up of some of the best fir and cedar lumber ever turned out of our Northwestern mills. You know the lasting qualities of fir and cedar. Therefore you can appreciate what this offer means.

All plans will be passed upon by a board of judges consisting of two carpenter contractors, one draftsman and two practical men engaged in the building material business. After the prize winner has been selected, forty others will be chosen as deserving honorable mention. To each of these we will give a coupon entitling him to a 10 per cent. discount from our regular rock-bottom prices on the first bill of lumber ordered from us.

This means a great saving, when it is considered that our regular prices are manufacturer's prices. We sell direct from our mills, enabling you to eliminate all middlemen. *Remember*, the contest closes August 1. All plans must reach us before that date to receive consideration. Send yours in as soon as possible. Enclose stamps if you desire to have the plans returned. Send for detailed information about the contest. Mail coupon now.

COUPON

HEWITT-LEA-FUNCK CO.
629 First Ave.,
Seattle, Wash.

I would like to enter your house-plan contest for the prize car of lumber. Send full particulars.

Name .....

Address .....

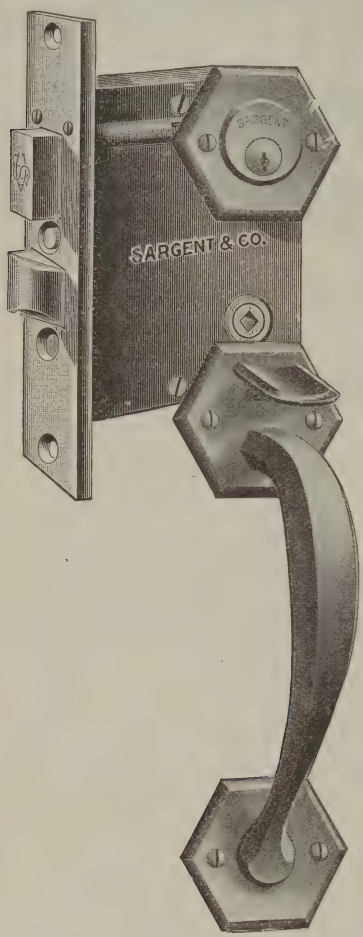
Occupation .....

Hewitt-Lea-Funck Co.
HIGH IN QUALITY, LOW IN PRICE, FIRST IN SHIPMENT
629 First Ave. Seattle, Wash.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BUILDERS' HARDWARE.

The Rehm Hardware Co., 1503 Blue Island Ave., Chicago, show on page 3 of their Build-



ers' Hardware Catalogue several cylinder front door locks and handles. The illustration shown here is their No. 9283 and described as follows: "Handles 2¾x14½ inches over all, including cylinder. Lock has cast bronze metal front, dull brass finish, bronze metal bolts, and cylinder, with three German Silver keys. Handles are cast bronze metal, one for each side of the door—dull brass finish. The lock is fitted with an adjustable front. The front can be beveled at any angle from flat to 1⅛ inch in 2 inches. Both bolts are operated from the inside by the key.

It will be seen that this cylinder front door lock has two handles, instead of only one. This gives the same effect on both sides of the door and this point should be remembered when prices are quoted. The Rehm Hardware Company's price on this lock is said to be very reasonable. A catalogue showing the full line of fine builders hardware can be had free for the asking.

DURABILITY TESTS.

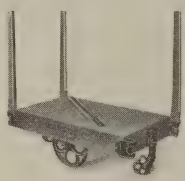
Every contractor and builder is interested in getting the very best and most durable materials for the houses which he erects. There is little indication that the builder intentionally puts in material which he knows is not especially adapted to the purpose.

Among the interesting tests recently made, is that of a test of regal sash cord. These tests made by the Government indicated that the cord would raise a twenty-pound weight on an average of two hundred and twenty thousand times before breaking. It is hard to imagine a window being raised this many times.

The Puritan Cordage Mills, 1560 Story Ave., Louisville, Ky., who manufacture regal sash cords, are equipped with the most modern sash cord machinery, their entire plant having been recently entirely reconstructed.

The Puritan Cordage Mills also manufacture cord and lines for numerous other purposes, and will be glad to send information regarding their material.

TRUCKS FOR THE SHOP AND JOB.



Every contractor has many occasions during the erection of even small buildings, as well as in getting out the material in the shop, for a small truck to carry material from place to place. The day is past when a contractor can afford to pay a man, or even an apprentice, to carry flooring, millwork, frames, etc., by hand upon a building when the same can be loaded upon a small truck and easily transported where desired.

The Henry Rowe Mfg. Co., Newaygo, Mich., have for some time been placing on the market a truck of this description, a cut of which is shown herewith. It is suggested that the busy contractor write to the Henry Rowe Co. for further descriptions, sizes, prices, etc., on these trucks, as well as the great variety of other labor-saving apparatus made by them.

NEPONSET PROSLATE ROOFING.

Durability is one of the first and most important requirements in roofing. Unless the material is proof against the action of rain, wind, sun and cold it will soon deteriorate and become worse than useless, as it will lead to the damage and destruction of the contents it was designed to protect.

Cost is frequently an item to be considered. Many materials are possible at a high cost, but it is not always the most expensive which is decided to be the best for the particular roof in question. Appearance counts as much as any one thing to the ordinary owner.

The manufacturers of ready roofing have been quick to see the trend of public opinion, and as a result there are a number of forms of roofing to choose from. Among these is Neponset Proslate Roofing as manufactured

New Rapid Tool Grinder
Great Time and Work Saver

THIS tool sharpening outfit lowers your expense, saves tools, time and money, and increases production. You can prove it by 30 days' free trial.

This Grinder is all metal with bevel gear drive like an automobile—the most indestructible grinding machine ever built—and the fastest. Power can be applied, but it runs 4,000 revolutions per minute by foot power as easy as a bicycle down grade. The most difficult job of grinding is the work of only a few minutes, and with the tool rests and special attachments your apprentice can do the work as well as a master mechanic.

Luther Dimo-grit Tool Grinders

The new Luther Grinder is mechanically perfect. The angle iron frame is strong and rigid; ball-bearing, shaft and bevel gears are enclosed in dust-proof housing and run in oil bath.

It can be converted into a drill, turning lathe, jig or rip-saw, has flexible shaft attachments, etc. Saves money in more different ways than any tool in your shop. Will not draw temper—no water cooling necessary.

Dimo-Grit Wheels—"the Wheels for Steel"

Dimo-grit—the wonderful, new artificial diamond abrasive, is the most suitable for all steel grinding. Cuts hardest steel as emery does copper—25 times faster cutting than the grindstone—6 times more efficient than emery wheels. No need of cooling with water—no danger of drawing temper. Carborundum wheels furnished if desired.

30 DAYS' FREE TRIAL

Write today for our 30 days' Free Trial Offer on our big 14-Tool Shop Sharpening Outfit and big free illustrated book showing the many uses of the Luther Shop Outfit and how it pays for itself—also McClure's Magazine story of the discovery of artificial diamond abrasives.

Write for 30 days' Free Trial Offer Today

LUTHER GRINDER MFG. CO. 919 Michigan St. Milwaukee, Wis.

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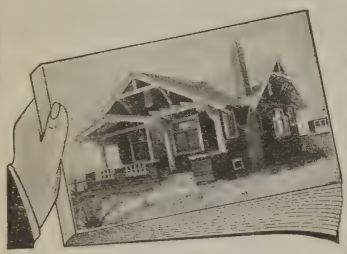


(FREE) HOME Builders Plan Book containing a nice selection of views for **COLONIAL HOMES, BUNGALOWS, and COTTAGES** with floor plans showing size of rooms and arrangements. Full description of finish, cost, etc. **There's it of years of planning and building homes.**

Residences $1000–$6000; **Bungalows** $500–$2500; **Cottages** $1000–$3000. Complete blue print drawings, working details, specifications and list of material at reasonable prices. Get this handsome **HOME BUILDERS' PLAN BOOK.** Send 10c coin or stamps for postage and mailing.

JENS C. PETERSEN, Architect
807 State Bank Bldg. Traverse City, Mich.

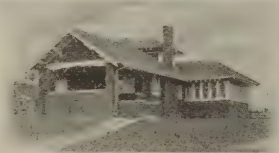
THE STEEL SQUARE

Two Volumes. A practical treatise on the use of the Steel Square. By Fred T. Hodgson. 600 pages, 500 illustrations. The author was the first—really the only—to write on this important tool, and the two volumes contain the easiest as well as the latest method of using the **Steel Square** for the solution of the many problems in building construction. The two volumes are of the greatest value to the young carpenter. Single Volume, Part I, cloth....$1.00
Part II..... 1.00
Two Volumes..... 2.00

Postpaid at These Prices

Hodgson Book Company

539 S. Dearborn St., Chicago



Miller's Bungalow Plans

are used exclusively in our book, **"Bungalows and Other Things,"** which contains photographs and floor plans of many artistic homes that can be built for $1,500.00 up. Get this book, it is the best of its kind on the market. Pick out the house you want and we will furnish the plans and specifications for $5.00 to $15.00. The book is receiving high praise from contractors and builders. **Price $1.00**

Burd F. Miller Co. 25 Brandeis, Omaha, Nebr.

Pattern-Making.—By G. H. Willard. With additional chapters on Core-Making and Molding. 224 pages, 312 illustrations, cloth covers.....Price, postpaid, $1.00

A book for the man who has to do the work. Written by a practical pattern maker of many years' experience. Gets right down to business in the first chapter and keeps it up throughout the book. Full of kinks and actual working information. Profusely illustrated. Every one following this trade, or intending to learn it, should have a copy of this valuable book.

This book and many others for practical men, for sale by

The Hodgson Book Co.

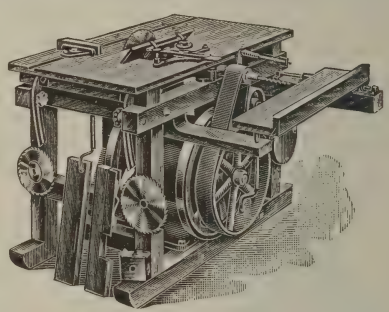
537 S. Dearborn St. Chicago

by F. W. Bird & Son, East Walpole, Mass. This roofing comes ready to lay and the methods followed by the manufacturers for laying prevents any possibility of water entering the roof.

Neponset Proslate Roofing is made in several patterns and in the colors red and green. Any combination of colors and pattern may be worked out without difficulty and this adds materially to the good appearance of the finished roof.

The success with which this material is meeting for use of a large variety of buildings should lead contractors and builders to investigate the merits of this material and obtain samples and other information from the manufacturers.

AMERICAN "CONTRACTOR'S" PORTABLE SAW BENCH AND VARIETY WOODWORKER.

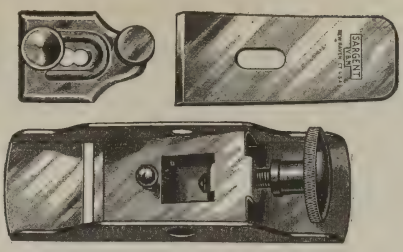


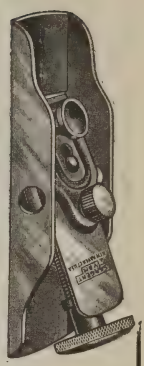
The necessity for a portable woodworker is so generally recognized that it is unnecessary to consider the advisability of having one for the shop or for the job. The only question in the mind of the contractor is which machine is best adapted for the particular work being done.

The American Saw Mill Machinery Company, 80 Laight street, Hackettstown, N. J., besides manufacturing complete plants for large saw mills and similar woodworking concerns, have recently placed on the market a portable woodworker, which is meeting with deserved success wherever used. As will be seen from cut, the machine is very strongly built and is equipped with all of the adjustments and attachments generally found on these machines. This machine can be had with either electric or gasoline power built in, and when so constructed is practically a complete mill in itself.

The American Saw Mill Machinery company are sending their literature regarding this machine to contractors who write for it, and where particularly mentioned, include their general catalogue No. 16, which shows everything for the saw mill, such as portable and stationary circular saw mills, gang and hand edgers, lumber trimmers, shingle and lath machines, log handlers, conveyors' supplies, etc.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.





Notice the Few Easily Adjusted Parts of this ALL STEEL Block Plane

Then consider that it is light, unbreakable and indestructable—a handy tool that you, as a practical mechanic, need

The size and shape will permit you to carry it in the pocket of your apron or overalls and you will find it particularly desirable for work on scaffoldings, etc.

It is strong, substantial, serviceable and has a powerful clamp that holds the cutter in place.

It bears the stamp

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Fully warranted by the makers. Made in two finishes: No. 4206, Highly Polished. No. 5206, Nickel Plated. Sold at hardware and tool stores.

The Sargent Tool Book, which fully describes all Sargent Planes and other tools, sent free on request.

SARGENT & CO., Tool Makers

No. 1151 Leonard Street **NEW YORK**

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We Want the Man Who Knows

good architecture and wants modern, up-to-date plans to send for our new book

"HOMES OF CHARACTER"

which contains plans, descriptions and accurate cost estimates of 40 artistic and **practical** Bungalows, Cottages and Houses. This book is full of new ideas for the wide awake contractor or home builder. **Send postpaid for $1.00. Descriptive Circular 2c.**

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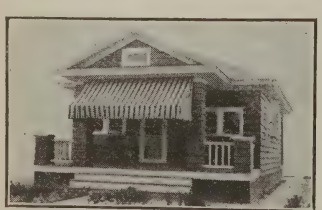

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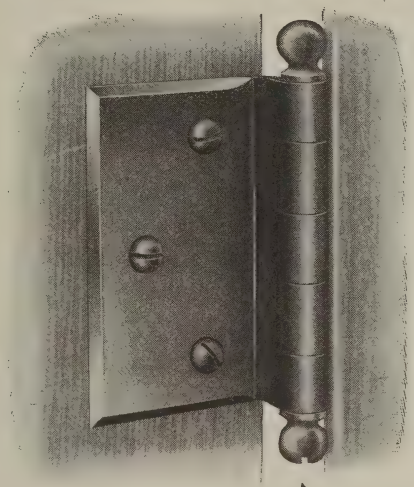

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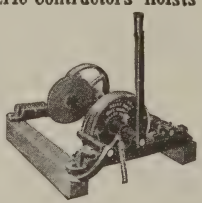

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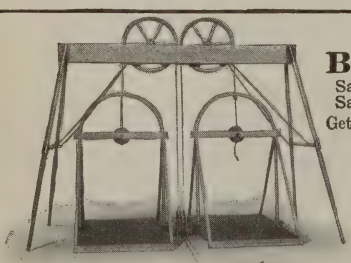

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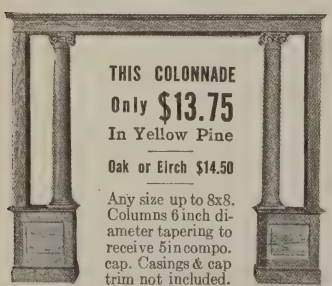

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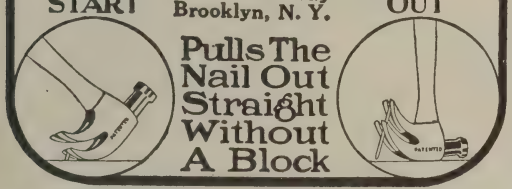

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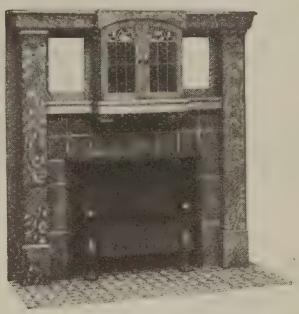

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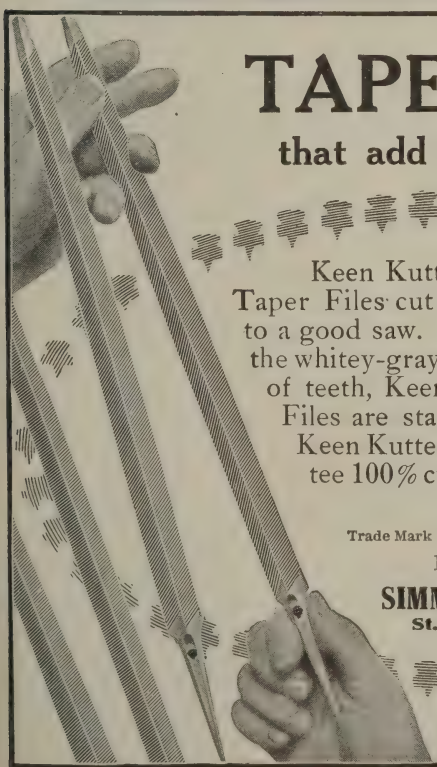

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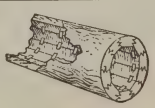

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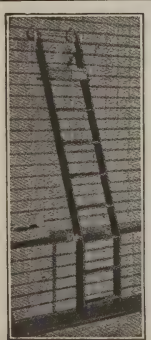

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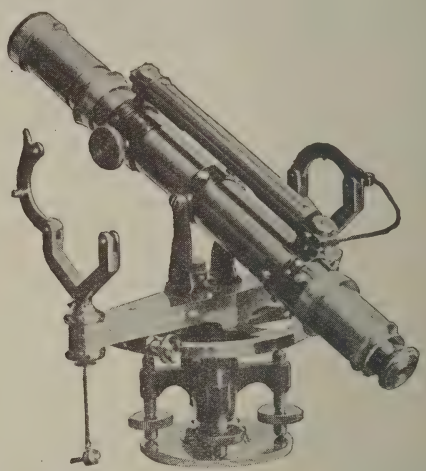

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Vol. II. Similar to Vol. I, on advanced lines. Many of the more difficult problems of construction are solved fully and plainly. The author's method of explanation being adapted to the class of readers most apt to study the subjects. Cloth, postpaid.....$1.00

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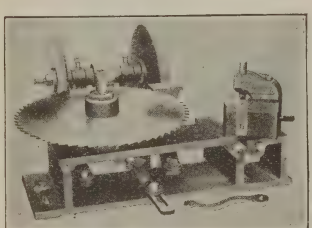
539 S. Dearborn St., Chicago



THE CONRAD
SAW
TOOL

Is a big money saver for Contractors, Builders and Millmen.

An inexperienced ordinary mechanic can

Gum, Joint, Set and Sharpen Circular Saws Easily and Perfectly

¶ The Conrad 14 inch machine handles saws from 5" to 24" in diameter and occupies only an 18 inch square.

¶ Price so low no one can afford to send saws away for repairs.

Write for Circular N, and Special Offer.

H. G. CONRAD, 709 So. Clinton St., Chicago, Ill.

143 Cities Used "STONEKOTE" Rough Cast In 1911

M.C. Clapp Res., Wichita, Kan.

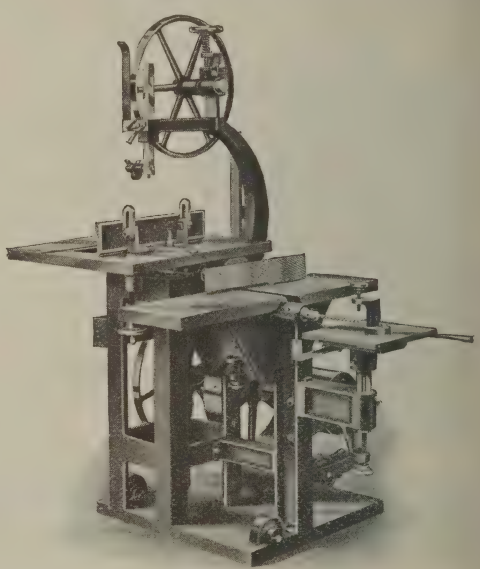
Before you build or repair the old home have your architect write us for book telling of "Stonekote" Portland Exterior. What color would you like a sample to be; Gray, Silver Gray, White, Buff, Red, Brown?

THE GARDEN CITY SAND COMPANY
MANUFACTURERS
709-11 Chamber of Commerce CHICAGO, ILL.

the roughest kind of a shelter, now the commonest laborer insists upon modern finish in his home. What would have been luxury to a prince two hundred years ago is now found in our smallest dwellings.

With all these changes, the contractor has new responsibilties. He must to a certain extent make up in numbers for the decrease in the work in individual houses. Where a house formerly took him a year to build, he must now break ground and complete the building in a few months.

There are several ways in which the contractor can keep up with the times. At a considerable expense and with numbers of men he can still do the work by hand. Subject to delays, he can have part of his work turned out in the mill.



The Tannewitz Type "C" Woodworker.

By the use of modern machinery, however, such as the Tannewitz Type "C" Woodworker, he can save a large part of the time which formerly went to his men. He can save a large part of the work which he formerly was obliged to get at the mill. He can utilize the lumber which he has on the job, or which he can obtain locally, instead of being dependent upon a mill catering not only to himself but to a hundred others.

These are some of the advantages of a woodworker. The Tannewitz Type "C" Woodworker as made by the Tannewitz Works, 317 North Front street, Grand Rapids, Mich., is a type of this class of machine made for use either in the shop or on the job. The different styles in which it is made makes it possible for the contractor to select the one suited to his particular work. The contractor building more than one house a year should investigate this woodworker and see the class of work to which it is adapted.

NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BUFFALO WIRE WORKS CO.

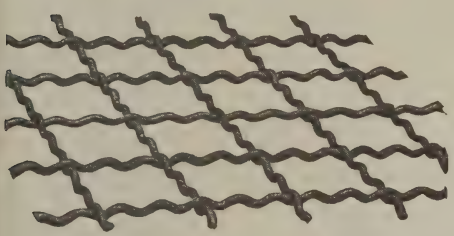
FORMERLY

Scheeler's Sons

Manufacturers of

WIRE CLOTH

Crimped Wire Concrete Reinforcement, Plain and Galvanized, in all size meshes and Gauges of Wire.



WIRE WORK

Plain and Galvanized Wire Lathing, also Grimm's Galvanized Corrugated Wire Lathing.

Buffalo Wire Fencing.

ARTISTIC METAL WORK

AGENTS FOR

Clinton Electric Welded Fabric

Samples and Prices Upon Application

SEND FOR OUR No. 5 CATALOG.

442 TERRACE

BUFFALO, N. Y.

Residence of W. T. Durrett; Audubon Park, Louisville, Ky.—Architect, Henry Walter.

The finest and most durable roofing in the world is cement-asbestos shingles *when properly made and seasoned.* They are absolutely *fireproof* and *indestructible.*

But how can you be sure they *are* properly made? You can insist on getting

Asbestos "Century" Shingles

"The Roof that Outlives the Building"

They are *compacted by hydraulic pressure* —not a weak spot anywhere to break down. The reinforcing asbestos fibers are *evenly distributed* through the cement—*interlacing in every direction.*

You can supply an Asbestos "Century" Shingle roof at just about the price your client expects to pay for a first-class roof.

You will save him the cost and annoyance of repairs and painting.

You will give him positive fire-protection —minimum insurance rates.

You will do him an all-round service. You will add to your good will.

Specify Asbestos "Century" Shingles *by name.* See that you get them.

Our nearest representative will supply you—numerous shapes and sizes, in four colors: Newport Gray (silver gray), Slate (blue black), Indian Red and *Veneered* Red.

Write us for Booklet "K. & M. 1912."

Keasbey & Mattison Co.

Factors

Ambler, Pennsylvania

Branch Offices in Principal Cities of the United States

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Northwestern Terra Cotta Company

Manufacturers of High Grade

ARCHITECTURAL TERRA COTTA

ENAMELED WORK A SPECIALTY

Main Office and Works, 2525 Clybourn Ave.
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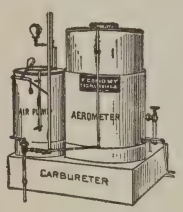
CHICAGO, ILLINOIS

Automatic Safe-Sanitary Gas Light and Fuel



Best for cooking and heating water for kitchen, bath and laundry.
No charging, no cleaning.
No generating, no dirt, soot, fuss or muss.
Cheaper than electricity, cleaner and safer than kerosene or acetylene (in use 16 years.)

Today is the time to write HOME department of
ECONOMY GAS MACHINE CO., 437 E. Main St., Rochester, N. Y.

DIAMOND EXPANSION BOLTS

Diamond "N" Screw Anchor
For fastening all kinds of material to brick, stone or concrete

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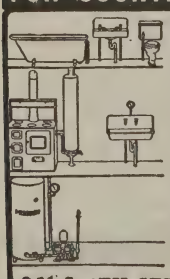
DIAMOND EXPANSION BOLT CO. 90 WEST ST NEW YORK

WATER WORKS FOR COUNTRY HOMES $37.80



EVERYTHING KNOWN IN
Plumbing Goods
Pumps, Windmills, Etc.
DIRECT AT
Manufacturer's Prices
Send for Big Low-Price Catalog—FREE
Missouri Water & Steam Supply Company
931 S. 6TH STREET ST. JOSEPH, MO.

ASK FOR "FIFTY-TWO HUNDRED."

The Kenneberg Roofing & Ceiling Company, Canton, Ohio, is constantly adding new styles to its already large list of metal ceilings, and other metal decoration. One of the latest is their number "Fifty-Two Hundred," which shows a ceiling particularly well adapted for large halls, such as moving picture theaters, etc.

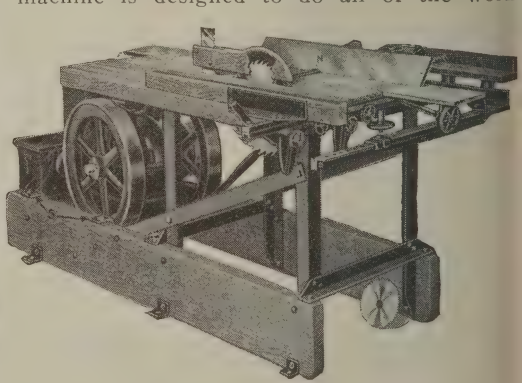
The Kanneberg Company has also prepared a special circular of directions for applying their "Style C" metal tile, which gives in great detail instructions for applying this roofing material under the various conditions ordinarily met with.

Information of this kind is very valuable at the time one is installing the work and it is somewhat unusual for this information to be available, except when goods are ordered. We understand that the Kanneberg Company will be very glad to send these circulars to contractors and others contemplating the use of metal for roofing or ceilings.

THE BALL BEARING WOODWORKER.

In the desire to construct a machine which would do the simplest work only, several manufacturers have made up saw tables and similar arrangements which come far short of doing either accurate or economical work. A frame of timbers or stock angle irons bolted together does not by any means make a complete woodworker.

The Parks Ball Bearing Machine Co., Knowlton and Fergus streets, Cincinnati, Ohio, have been manufacturing woodworkers for twenty-five years, and their latest model, as shown on this page, is a marvel of simplicity and mechanical construction. This machine is designed to do all of the work

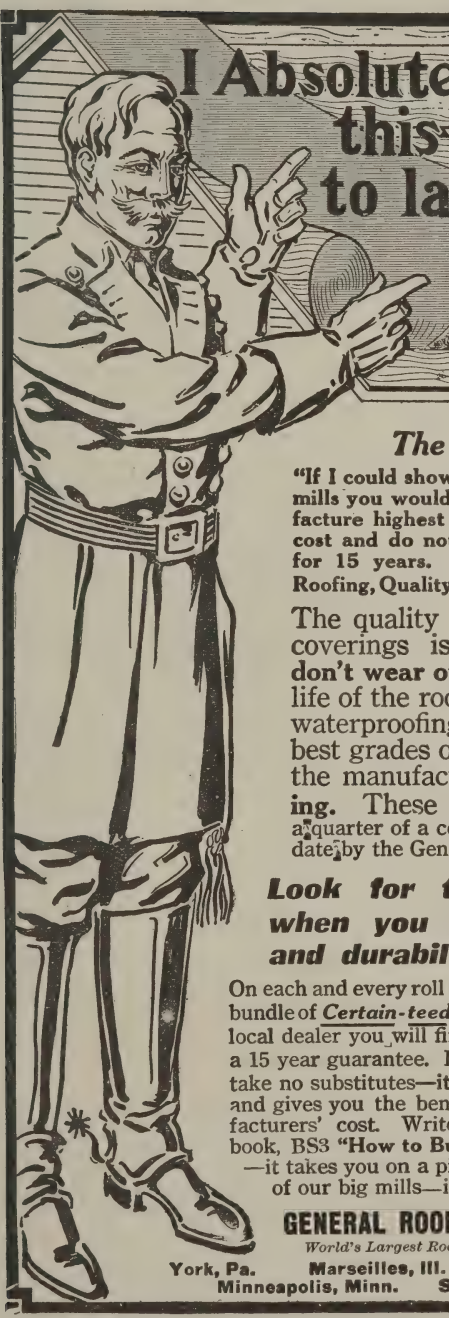


commonly done in the small shop or on the job, such as sawing, planing, dadoing, beveling, boring, etc.

The fact that all of the shafts run on ball bearings shows the mechanical perfection to which this machine is brought. We are advised that a new catalogue has just been prepared, which describes this machine in great detail, and we believe that it will be in the interests of every contractor to see the advantages of this model.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

I Absolutely Guarantee this roofing to last 15 years



The General Says:

"If I could show you through my three enormous mills you would then readily see why I can manufacture highest grade, durable Roofing at a low cost and do not hesitate to guarantee it to you for 15 years. That's why I call it *Certain-teed* Roofing, Quality Certified, Durability Guaranteed."

The quality of the asphalt used in roof coverings is important because **roofs don't wear out, they dry out.** The real life of the roofing is in the saturating and waterproofing compound used. Only the best grades of raw materials are used in the manufacture of ***Certain-teed* Roofing.** These are selected as the result of a quarter of a century's experience and kept up-to-date by the General's Board of Expert Chemists.

Look for the Certain-teed label when you buy Roofing—quality and durability guaranteed.

On each and every roll of ***Certain-teed* Rubber Roofing** or bundle of ***Certain-teed* Rubber Shingles** you buy from your local dealer you will find a ***Certain-teed*** label of quality—a 15 year guarantee. Insist on this ***Certain-teed*** label and take no substitutes—it is for *your protection,* and gives you the benefit of the low manufacturers' cost. Write today for our new book, BS3 **"How to Build for LESS Money"**—it takes you on a picture trip through one of our big mills—it's free for the asking.

Free

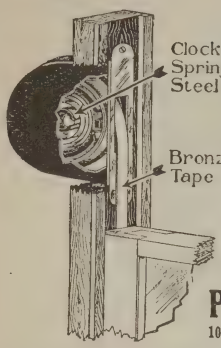
Book

GENERAL ROOFING MFG. CO.

World's Largest Roofing Manufacturers

York, Pa. Marseilles, Ill. East St. Louis, Ill. Minneapolis, Minn. San Francisco, Cal.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Unit Sash Balances

Patent Pending

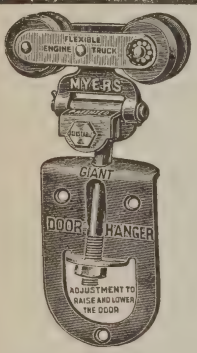
Take the place of weights and cords in new buildings. Cost less than weights and cords. Weights and cords are always getting out of order, Unit Balances never are. Unit Balances have uniform face plates—All mortises cut at the mill.

UNIT BALANCES are Sold at a Flat Rate Per Window

Send for New Catalog with Detail Drawings and Prices

PULLMAN MFG. CO.

10 Allen Street ROCHESTER, N. Y.



MYERS GIANT

and New-Way Adjustable Tendem Door Hangers

PATENTED

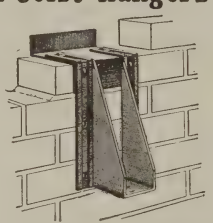
For Tubular Girder Track

Are adjustable up or down, and in or out. Trolley Wheels are heavy turned steel, revolving on steel roller bearings, and run inside the tubular girder track. Not affected by rain, sleet or ice. Write for descriptive circulars and prices.

F. E. MYERS & BRO.
ASHLAND, OHIO

Van Dorn's Steel Joist Hangers

Have no Equal. Send for Catalog

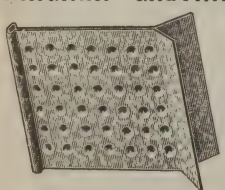


No. 1. Steel Joist Hanger for Wood Header.

No. 4. Steel Joist Hanger for Brick Walls.

VAN DORN IRON WORKS, Cleveland, Ohio

NIAGARA GALVANIZED WALL PLUGS



For Building into Brick, Stone or Concrete Walls as a Base for Nailing

This Wall Plug can be put in place in one-tenth the time it takes to dig out mortar and drive in a wooden plug, and it is four-fold more secure Will last as long as the building. Write for Folder 57-B and sample.

NIAGARA FALLS METAL STAMPING WORKS

Manufacturers of Hardware Specialties

NIAGARA FALLS, N. Y., U. S. A.

Niagara Wall and Veneer Ties for use in brick and brick veneer walls, 12-inch Galvanized Wall Ties for stone, brick and concrete block walls, sash pulleys, sash chain, sash fixtures. 9M

PAINT AND VARNISH.

The Gordon-Hittl Company, 176 Federal street, Boston, has been incorporated under Massachusetts laws to engage in the manufacture of and buying and selling of paints, varnishes, coatings, shellacs, oils and general paint supplies. Hector M. Gordon, the president, needs no introduction to the trade, having managed successfully for many years the New England business of the Sherwin-Williams Company, also the business of Harrison Bros. & Co., both of New York and New England. For the last few years he has been associated with Wadsworth, Howland & Co. as sales manager. Anton P. Hittl, the treasurer, was associated with Mr. Gordon while he was with the Sherwin-Williams Company and Harrison Bros. & Co., succeeding Mr. Gordon in the management of the New England business of the latter.

THE KING OF FLOORING.

Oak flooring possesses many advantages over flooring of many other woods. The general distribution of oak throughout the country, as well as the large size to which this wood grows, has made it prominent as a flooring material. Its durability is taken as the standard for all materials and its natural beauty stands unquestioned.

The Oak Flooring Bureau, 883 Hammond building, Detroit, Mich., are sending out a most interesting booklet showing the various grades of flooring and the best methods of handling, laying, finishing, etc. Every contractor should have this book as a guide, both in obtaining work and in putting it in place.

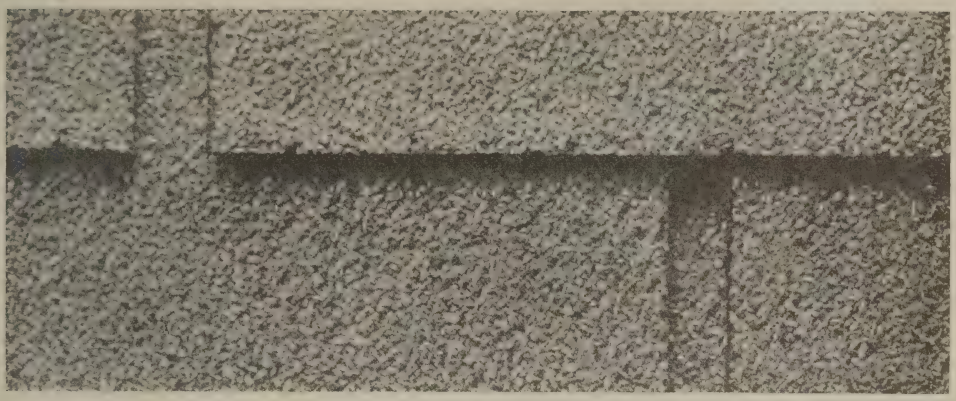
THE JAHANT DOWN DRAFT FURNACE.

The daily mail of every large manufacturing concern contains not only orders, but letters from pleased and displeased customers. While the orders are welcome for their intrinsic value, the complaints are frequently even more valuable, as they point out deficiencies in material, methods of manufacture, shipping, and the operation of the various apparatus, which has been purchased. The letters from the pleased customers are equally valuable, as showing that the manufacturer has achieved the goal which he sought, and has shipped to his customer an article of merit.

The manufacture of furnaces and heating supplies is a specialty which deserves more than ordinary care. The apparatus does more than simply work or turn out work, as it uses up fuel and supplies, and unless properly designed, built, installed and operated, is a source of expense without giving proper returns. A furnace must do more than merely burn; it must furnish heat, economically and in such varying quantities as the weather requires. The furnace which comes short of this is more or less of a failure.

The Jahant Heating Company, 90 Mills street, Akron, Ohio, have had their share of letters regarding their furnaces. A great many have not only sent in their comments,

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



DID you ever see a more beautiful roofing than this? Note the chipped slate surface—imagine the effect in the natural dark red, or green, or gray coloring—

FLEX-A-TILE
ASPHALT SHINGLES

are new, durable, inexpensive. They are made of solid asphalt into the surface of which is embedded chipped slate or granite—rolled in until it becomes an actual part of the material and can't come out. The natural color of the slate or granite gives the coloring to the shingles and these colors can't change—they can't fade.

FLEX-A-TILE Shingles are cheaper than wood shingles that have been stained—they are easier to lay—and they will last as long as the house stands.

IT'S A WINNING PROPOSITION
FOR ANY CARPENTER AND BUILDER.

Write Today for a free sample of Flex-a-Tile Shingles and the Flex-A-Tile book.

THE HEPPES COMPANY

1012 Forty-fifth Avenue **Chicago, Illinois**

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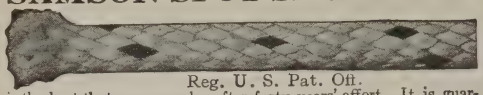
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

SAMSON SPOT SASH CORD



Reg. U. S. Pat. Off.

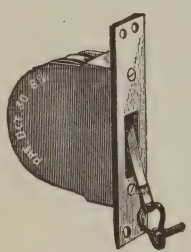
is the best that we can make after forty years' effort. It is guaranteed by the Samson Cordage Works to be free from imperfections of braid or finish, and it will last longer than any other device for hanging windows.

Our trade mark on the label is Samson and the Lion **in any color.** The Spots **in any color** are our trade mark on the cord, used by us for 18 years to show, after the label is removed, who guarantees the quality of the cord. You recognize either of these marks by the design, not the color. Don't be misled by imitations.

Samson Cordage Works, Boston, Mass.

Reg. U. S. Pat. Off.

Caldwell Sash Balance



Does away with weights and cords and **vastly** more durable. Makes sashes work perfectly. Permits greater window space in new work, as box frames are not necessary. May be applied to old windows without altering sashes or frames.

Write for Circular to the

Caldwell Mfg. Company

2 Jones Street Rochester, N.Y.

HAVE YOU POWER BORING MACHINES?

IF SO, No Sash Pulley Can be Classed with the

Grand Rapids No. 12

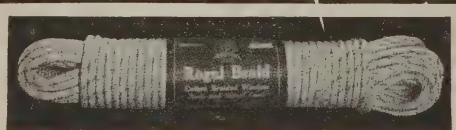
Mortised at one Punch with the Quadruple Bit

or bore four holes with a single bit and it's done.

No cutting, fitting nor trimming. Saves time and money. Write for Free Samples.

Quadruple Bit, Price $5.00
Can not be used in a hand brace.

Grand Rapids Hardware Co.
118 Pearl St., Grand Rapids, Mich.



Regal Sash Cord is always marked with **Two Blue Strands.**

This sash cord has been approved by the United States Government and many leading architects. It will outwear the best chain 3½ times. It is perfect in construction and, therefore, without waste. *Send for the surest test, that made by the Government, and for free samples.*

Puritan Cordage Mills

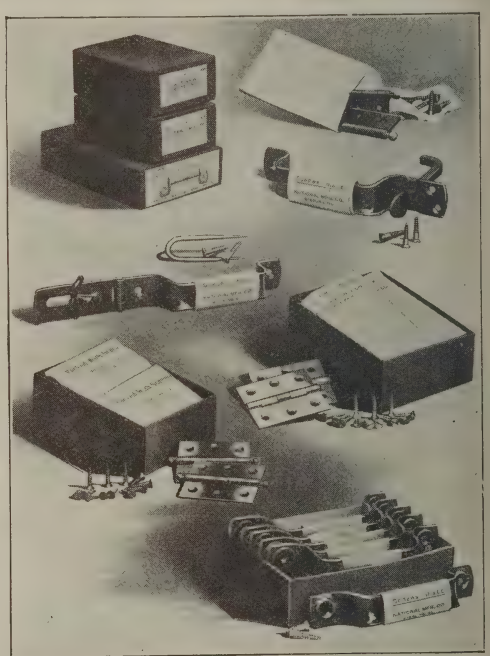
1560 Story Ave. Louisville, Ky.

but have also sent in photographs of the houses in which they have been installed. The Jahant Heating Company has collected these into a most interesting booklet showing the vast variety of buildings in which the Jahant furnace operates.

This booklet—"What Users Say"—will be sent on request as well as the complete catalogue of the Jahant down draft furnace. The catalogue contains a complete description of the Jahant guaranty bond, which gives the purchaser 360 days to test the furnace, as well as instructions for obtaining estimates, ordering, installing, etc. Every contractor and builder should have these books.

CAREFUL PACKING

However carefully goods may be manufactured and however correct the design and



pattern may be, they count for little unless they are properly packed so that the purchaser gets the goods which he ordered and gets everything complete.

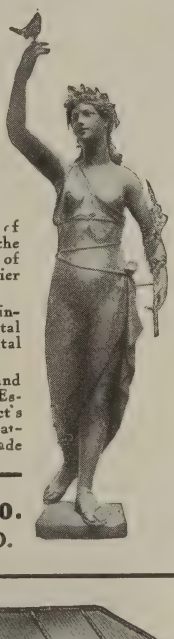
The cut shown in this article is taken from a recent circular of the National Manufacturing Co., Sterling, Ill., and shows the manner in which they assemble and pack their hardware for shipment. As may be imagined, this packing insures that the contractor on opening the packages finds everything necessary, such as screws, hooks, staples, etc.

The National Manufacturing Co. are particularly busy at this season of the year on screen hangers, their No. 80 Automatic Hanger meeting with universal approval. These hangers are designed for full-length screens, and permit the screen being opened for the purpose of cleaning the windows, etc.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Sheet Metal Statuary of Rare Artistic Worth

WITHIN the last quarter of a century there have been reproduced at the Mullins factory, Salem, Ohio, statues of Sheet Bronze and Copper that are nothing short of marvelous. Many of them were made from the models of famous sculptors, to their entire satisfaction.



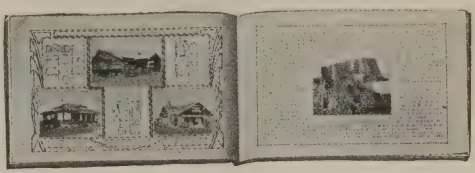
We are prepared to reproduce, in minute detail, the most delicate lines of any model. It is this faithful portrayal which helps to account for the world-wide fame of Mullins Sheet Metal Statuary. Diana on the top of Madison Square Garden, the group on the New York Life Building, the Statue of Progress, Chicago, are among our earlier achievements.

We also make Fireproof Metal Windows, Skylights, Cornices, Finials, Metal Tile Roofing and Sheet Metal Ornamental Work of every description.

Tell us what you're interested in and we'll send the proper catalogs at once. Estimates promptly submitted on architect's drawings. Attractive prices. Quick, satisfactory service. Discounts to the trade on application.

The W. H. Mullins Co.
210 Franklin St., SALEM, O.

"Be the Bungalow Man of Your Town"



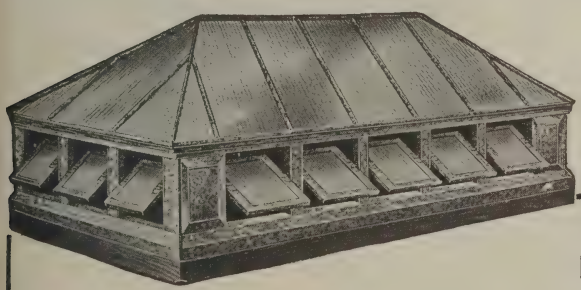
This Bungalow Book FREE

The Bungalow covered with **Red Cedar** Shingles from "crest to foundation" has come to stay. Everybody likes it. Shingles afford the most artistic effects. Can be stained in any color to harmonize with surroundings. Stain costs only half as much as paint. You stain a bungalow once while you paint clapboards twice. And remember

Washington Red Cedar Shingles Do Not Warp

Our Bungalow Book contains Photos and Floor Plans of genuine Pacific Coast Bungalows—with actual cost to build in the Pacific Northwest. It tells "The Story of Red Cedar Shingles and their wonderful long life."

Red Cedar Shingle Mfrs. Association
Representing over 200 Mills—Daily capacity 20 millions
497 Arcade Annex **SEATTLE, WASH.**



WILLIS Self-Installing SKYLIGHTS

From Factory to Builder
No Other Labor Necessary

Willis Skylights are constructed so that any person handy with a hammer or screwdriver can install them. It is not necessary to have a soldering outfit or tinners' tools.

They are shipped knocked down after being set up and tested in the factory, are watertight without the use of putty and designed to give the greatest amount of glass area. The ridge and gutter bars cannot sag, buckle or spread.

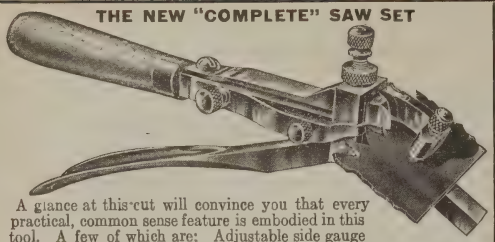
Send us your plans or a rough sketch with dimensions and we will furnish working drawings and an estimate. **You can install it yourself.**

Catalogue No. 6 gives our large line of other Sheet Metal Building Material. Send for it.

WILLIS MFG. CO., GALESBURG, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE NEW "COMPLETE" SAW SET



A glance at this cut will convince you that every practical, common sense feature is embodied in this tool. A few of which are: Adjustable side gauge which brings the point of each tooth under the anvil. Top Clamp Screw when adjusted, regulates the amount of set. The setting or wearing surfaces are made of Tool Steel and carefully hardened. Front Screw holds down Saw, allowing free use of left hand. Compact, attractive and low in price. Black, 75c. Nickel, $1.00. Order of your dealer or a sample will be sent on receipt of price.

OTIS A. SMITH, ROCKFALL, CONN.

WORK BENCHES

Rapid Acting Vises
Drawing Tables
Drawing Boards
Drawing Cabinets
Electrotype Cabinets

We also make Turnings and Special Wood-work of all kinds to order. Don't buy until you get our Catalogue and prices.

Henry Rowe Mfg. Co. NEWAYGO, MICH.

A Tool Bag For You

Mason's Tool Bag.

Mason's, Joiner's, Carpenter's

In fact we make Tool Bags in Canvas, and Leather for every Mechanic. Want our Catalogue?

Excelsior Bag & Mfg. Co.
TROY, N. Y.

It Works Like a Plane

The Boss Floor Scraper

The Boss is the only Floor Scraper made that will plane a floor without leaving a square cut where knife first starts cutting. WHY? Because the Boss is made with a gauge on front to which is attached a pear shaped wheel which raises when the machine is pulled and lets the knife down gradually. ¶ The Boss can be set for any thickness of shaving. It also can be set for any shearing cut, right or left, up or down, to suit the kind of lumber. ¶ It is guaranteed to give absolute satisfaction.

G. J. KEPPLINGER
Main Office, Dwight, Ill.
MANUFACTURED ALSO IN CANADA

JUST FOR SHINGLING.

Multiple tools with everything from a can opener to a monkey wrench are all right for some purposes, but for shingling, a hammer should be designed for that purpose alone. Rapidity and accuracy of nailing requires a firm head, good balance and an axe edge for splitting shingles when required.

L. A. Sayre & Son, 340 Mulberry treet, Newark, N. J., make a specialty of shingling and lathing hatchets. Their No. 140, shown in the accompanying cut, is meeting with favor among this class of mechanics, whose pay frequently depends on rapid and accurate work. Descriptive matter referring to these and their other special tools will be sent on request.

LOCK JOINT COLUMNS.

The manufacture of any outside trim requires great care in the selection of materials and in their manufacture. Possibly no part of a work is more particular than that of columns, pedestals, pergolas, etc., on which the weather acts with full effect.

Lock Joint Colums in Place

The Hartmann-Saunders Company, making columns under the Koll patents, have been particularly successful in work of this character. The peculiar joint with which they build up their columns precludes the possibility of any portion of the column coming out or working loose.

The last catalogue of the Hartmann-Sanders Company shows a number of styles of columns adapted for residence work, pergolas, etc., as well as the table of prices and sizes. The contractor or builder anticipating the erection of high-grade work of this character should get in touch with the Hartmann-Saunder Company, 2155 Elston avenue, Chicago, Ill., and learn from them the best sizes, etc., for their work.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Residence of E. A. Wall, U. S. A.
Salt Lake City, Utah
R. Kletting, Architect
BUILT OF METAL LUMBER

Berger's Metal Lumber

Makes possible a positively fireproof and shockproof structure. It is inexpensive, practical and is easily erected. The simple erection drawing enables any inexperienced mechanic to do the work.

ITS MANY ADVANTAGES

are explained minutely in our new catalog, **"METAL LUMBER."** It tells you what it is, how it is made and how shipped. It gives illustrations of many prominent buildings and residences throughout the country in which it has been used. Send for one.

THE BERGER MFG. CO., Canton, Ohio

For prompt shipment write nearest branch
New York, Boston, Philadelphia, Chicago, Minneapolis, San Francisco, Atlanta, St. Louis

Also manufacturers of Prong Lock Studs and Furring, Rib-Trus, Ferro-Lithic and Multiplex Reinforcing Plates, Metal Ceilings, Expanded Metal Lath, Sidewalk Forms, Raydiant Sidewalk Lights, etc.

6-L-26-11

This is a cross section of a

Winthrop Asphalt Shingle

Note the taper—thickness and weight all on the exposed butt where it is needed. Made of solid Asphalt—with a chipped slate surface—wonderfully handsome. Absolutely weather proof and as durable as the house itself. Uniform size—easy to lay.

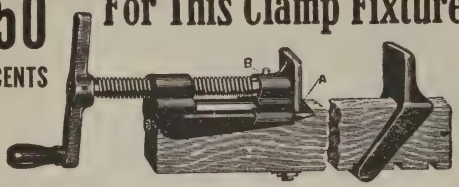
We want to send a free sample to every carpenter and builder

Write for It

Winthrop Asphalt Shingle Co. - 10 Sixty-First St., Chicago, Ill.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

50 CENTS For This Clamp Fixture



It is unequaled for strength, quick action, and lasting qualities.

Write for catalog of Sheldon's Clamps and Vises

E. H. SHELDON & CO. 178 Nims St. MUSKEGON, MICH.

Last a Lifetime and Give Satisfaction to the End!

The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalog. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book, "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

D.R.BARTON 1832. ROCHESTER, N.Y.

MACK & CO., Sole Makers

Brown's Race Rochester, N. Y.

BOMMER SPRING HINGES

ARE QUALITY GOODS

Reject Substitutes. The Springs Never Go Lame

Spring Hinges lead the strenuous life in Builder's Hardware; no other article in their line endures such wear and tear; therefore don't err in judgment, use BOMMER SPRING HINGES; they stand up to their work.

This Trade Mark on Every

Genuine Bommer Hinge

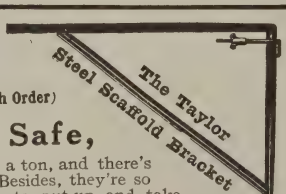
For Sale by All Hardware Merchants

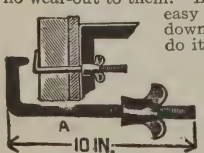
$13.95 PER DOZ.

(If You Send Cash With Order)

Absolutely Safe,

for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.





Write for Catalog of Builders' Specialties

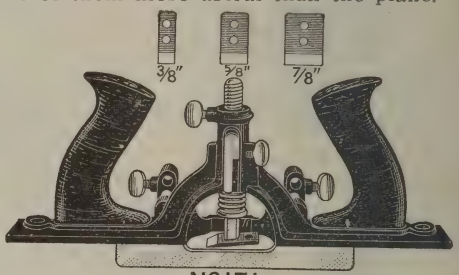
James L. Taylor Mfg. Co.

Poughkeepsie, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE STANLEY DOOR TRIM PLANE.

The primary carpenter's equipment consisted of a saw, hammer and chisel. From these a great variety of tools have evolved, none of them more useful than the plane.



No 171

One of the latest patterns of planes, which is intended to do away with a great amount of the work formerly done by a chisel in the hands of a skilled workman, is shown on this page and is known as Stanley's No. 171. This plane will make mortises for butts, face and strike plates, escutcheons, etc., without the use of a butt gauge or hand chisel. The construction of this plane allows the blade to work from either end of the plane or across it. A novel feature consists in a spring, which prevents a heavier cutting than can easily be taken care of.

This plane can also be used as a router for surfacing the bottom of grooves perfectly parallel with the general surface of the work.

The Stanley Rule & Bevel Co., New Britain, Conn., have prepared a special circular showing the operation of this handy tool, and they will be very glad to send it to those interested.

CARPENTERS TOOL CASES.

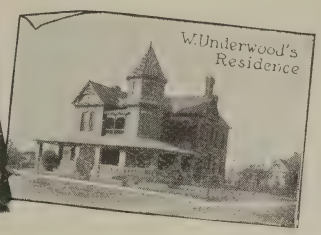
The columns of the NATIONAL BUILDER have several times published articles showing the construction of home-made tool cases. Every carpenter has a somewhat different equipment for his class of work and generally believes that his own tool case is the best for taking care of his tools and for carrying them from job to job.

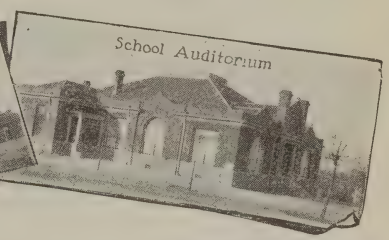
The Wedell & Boers Co., 157 Jefferson avenue, Detroit, Mich., manufacture the Indescructo Tool Case. Among the advantages which they claim for this style of case is that they are light and strong; the sides are made of three-ply veneer, and all edges and corners are reinforced with steel. Over the veneer is glued a strong canvas, which is water proof and varnished, making the cases water proof and indestructible.

These tool boxes are made in several regular sizes and the Wedell & Boers Co. advise us that they have facilities for making special sizes for special tools at slight increase over the stock sizes.

These tool cases are made by improved machinery and in such numbers that the price is much less than a carpenter can afford to make one for. The circulars showing these cases will be sent on request.

How One Town Uses CORTRIGHT METAL SHINGLES





Look→ At this→ Big Business-

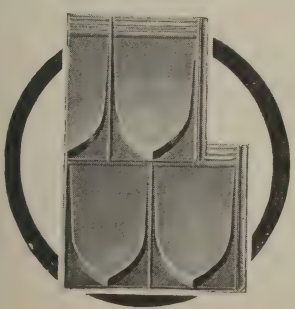
churches, public buildings and handsome residences—where you can use CORTRIGHT METAL SHINGLES just as well as on the more modest dwellings or smaller bungalows.

Cortright Metal Shingles

are so attractive and offer so many advantages to property owners that Contractors and Builders find, besides making attractive profits, that their whole business rapidly increases, for each user is so well pleased that one sale invariably means repeat orders.

If you could talk with some of the other men in your own line who have investigated and adopted CORTRIGHT METAL SHINGLES in the past twenty odd years, we would not have to urge you to write for our special Contractors and Dealers proposition, but ***if you will send for this proposition you will realize what a good opportunity you have overlooked.***

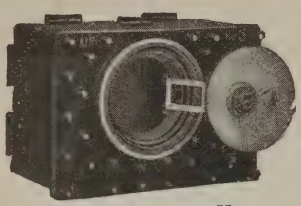
Write us now.



Cortright Metal Roofing Co.

Philadelphia and Chicago

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



The GALE WALL SAFE

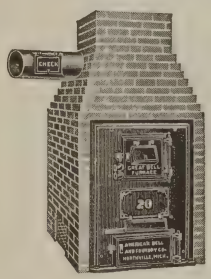
It makes your Valuable Papers, Jewelry and Silver secure against Porch Climbers, Petty Thieves, Fire, etc.

No Home or Apartment House complete without one. It has a combination lock.

Write for Descriptive Matter Today

WILLIS MFG. CO., Galesburg, Ill.

FRED LIEBRICH, Agent for Cook County
1102 Monadnock B dg., CHICAGO, ILL.



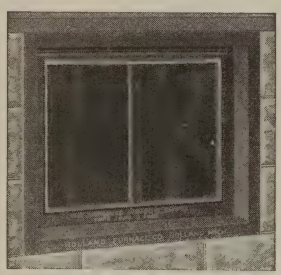
A Hot Air Furnace

For Less Than $50 Complete
FOR 5 AND 8 ROOM DWELLINGS

An unheard of Price and a most Remarkable and Indestructible Furnace. No Pipes—no Lost Heat.

American Bell & Foundry Co.
NORTHVILLE, MICH.

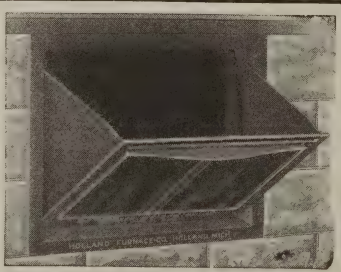
The Improved Window Chute



A Real Glass Window when closed, which is burglar proof

A Perfect Coal Chute
when open

LOCKS FROM OUTSIDE AND CAN ONLY BE UNLOCKED FROM INSIDE

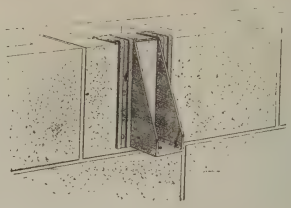


Write for Proposition to Contractors and Builders

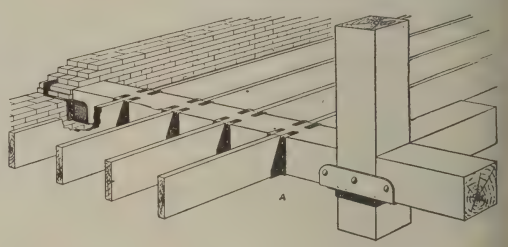
HOLLAND CO., Holland, Mich.

JOIST AND BEAM HANGERS.

In the advance of modern construction, there have been improvements, both in materials and methods of construction. The advent of mill construction and heavy framing necessitated the use of hangers, post caps, etc., which would bring the beams flush with the girders, thus giving the maximum storage capacity to the building.



Even in residence work, there are numerous places where metal hangers, etc., can be used to advantage. Where tile or concrete blocks are used for the walls or partitions, a hanger of this character is practically a necessity.



The Van Dorn Iron Works, Cleveland, Ohio, have a catalogue showing a great variety of sizes of hangers, post caps, anchors, and other materials for builder's use. The illustrations with this article show some of the purposes for which this class of work is adapted. Every contractor should have a complete catalogue, that he may be posted on the best methods of putting up his work.

ALABASTINE.

One of the reasons why modern materials are not more generally used is that the contractor has been so busy that he has not taken the time to investigate new materials and new methods. As long as there was plenty of work there was no incentive for investigating either the advertisements which appeared in his trade papers, the arguments presented to him by the local storekeepers, or by the traveling representatives of the various material manufacturers.

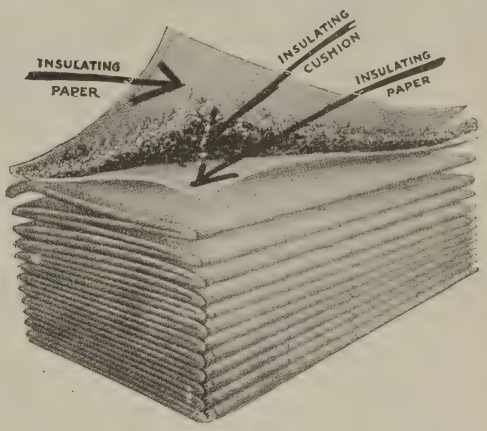
The time has come, however, when the up-to-date contractor must be posted on new materials, not only on their prices, but their advantages and methods of use. Owners and prospective builders are carefully studying the magazines and are deciding for themselves what shall be used, and this class of customers looks with suspicion upon a contractor who is not as well posted as themselves.

In order that the contractor may be posted on Alabastine, the Alabastine Company, 735

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

There's A Big Difference In Insulating Materials

It takes from 25% to 35% more coal to heat a building when the walls are lined with ordinary building sheathing papers than when they are lined with Keystone Hair Insulator.



The saving in coal in a few winters usually amounts to considerably more than the cost of the material.

You know that dead air (common atmospheric air in a stationary state) is the most nearly perfect non-conductor of heat and cold known. And a single layer of Keystone confines more dead air than many layers of the best sheathing paper. We have proved this by actual tests. And as a sound-deadener, Keystone is unequaled when placed between partitions and floors.

Keystone Hair Insulator

is made of a heavy layer of cattle hair, cleansed and sterilized, securely fastened between two sheets of strong, nonporous building paper.

Keystone Hair Insulator is Nature's own protector from heat and cold.

It will not settle or pack down, dry out, rot or attract moisture. Is an effective fire retardant as it will not carry flame. Is also inodorous and vermin-proof, and will last as long as the building.

Many other advantages of Keystone are set forth in our Catalog. Our nearest branch will send you a copy and samples on request.

H. W. JOHNS-MANVILLE CO.

Manufacturers of Asbestos and Magnesia Products

ASBESTOS

Asbestos Roofings, Packings, Electrical Supplies, etc.

Albany
Atlanta
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Philadelphia
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St. Louis
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Seattle
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Tacoma
Washington
Wilkes-Barre

For Canada—THE CANADIAN H. W. JOHNS-MANVILLE CO., Limited

Toronto, Ont. Montreal, Que. Winnipeg, Man. Vancouver B. C.

1375

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

STEEL CEILINGS

Are you figuring on using a medium priced Steel Ceiling? Get our catalog by all means. It shows a line of beautiful ceilings of sufficient variety to please almost any individual liking, yet at prices surprisingly low.

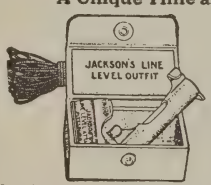
The possession of this catalogue and a knowledge of our line and prices will save you many a dollar if you are an occasional or frequent buyer of Steel Ceilings.

Write for It Today

INDIANAPOLIS CORRUGATING CO.
Indianapolis, Indiana

THE JACKSON ALUMINUM LINE LEVEL

A Unique Time and Labor Saving Device

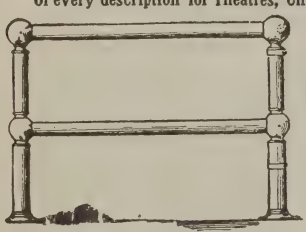


It takes the place of the old-fashioned sixteen-foot straight edge, yet it can be carried in your vest pocket. ¶No contractor, builder, carpenter, mason, bricklayer, architect or plasterer should be without one. ¶Just stretch your line and hang the level on it—it's positively accurate. ¶The complete outfit is put up in a neat leatherette case and consists of the level with a 40-ft. line, also a spring clamp for attaching the level to a steel square or pocket rule, thereby serving as a plumb rule or bench level. At your hardware dealer's or sent for $1 postpaid.

JOS. WOODWELL CO., Sole Agts., 201-203 Wood St., Pittsburgh, Pa.
Write for Catalog of Woodworker's Tools

BRASS RAILS

Of every description for Theatres, Churches, Offices, Etc.



HAND RAILS
PUSH PLATES
KICK PLATES, Etc.
BRASS FRAMES
BRASS EASELS
BRASS GRILLES

For Theatre Lobbies.

LET US BID ON ALL BRASS WORK

Inducing Prices, High Class Workmanship. Send us list of requirements.

THE NEWMAN MANUFACTURING CO., | Established 1882
717-719 Sycamore Street, Cincinnati, O.

TO KEEP OUT DAMPNESS

Paint Your Concrete and Brick Buildings with TOCH BROS.

R. I. W. PAINT

"Remember It's Waterproof"

and your cement floors with **TOCH BROS. Cement Filler** and **Floor Paint**, Pat'd. Proof against Water, Acid, Fumes or Alkali. **Special elastic compound for each specific purpose**

The Garden City Sand Co.

709-711 Chamber of Commerce, Chicago

N. B. Grandville Road, Grand Rapids, Mich., is sending out a great deal of information and literature pertaining to their product These circulars contain color plates and samples showing the colors in which Alabastine may be obtained, as well as various styles of decoration possible with this material.

The Alabastine Company also publishes a monthly magazine entitled "Brush and Pail," which is intended to be a guide for painters and decorators when using Alabastine. We understand any contractor using material of this character will be placed upon the mailing list of this magazine free on request to the Alabastine Company, and this will also entitle him to the various premiums, etc., offered by the Alabastine Company.

THE BOY AND THE MAN.

Education is the keynote of advancement. Every village, town and city contains facilities for the early schooling in the rudiments, and the larger towns and cities contain schools and colleges for those with the means and time to take advantage of them.

There are many, however, who from early environment, have been prevented from obtaining education along the special lines in which they are specially interested.

Many boys are forced into work when they should be in school and their surroundings do not always encourage them to take up home study.

There comes a time, however, when the thirst for knowledge overcomes all other ideas and the boy or man looks around to take an account of himself and see how he can best improve his circumstances. It may be that his associates encourage him to better himself, or it may be that his observation of how others have risen leads him to attempt to do likewise; at all events, there is a desire for knowledge and a feeling that once knowledge is obtained, his life will be easier and his future more certain.

The International Correspondence Schools were founded some years ago with the idea of improving the condition of the men in the mines in and around Scranton, Pa. From this small beginning various other courses have been prepared along the lines of building, mechanics, engineering, etc. In the building and architectural courses alone the schools have had a most wonderful success. A recent catalogue describes the progress of numerous scholars who have advanced from the most menial positions to that of architects, engineers, contractors, etc. The credit for this advance is given entirely to the course of study prepared by the school.

The theory of correspondence education is somewhat different from that of the ordinary day school, as the time of the scholars is limited and varied, and as the capacity for advance varies greatly, the course must be so arranged that each can study independently of all the others, the advance being gauged entirely by the amount of work correctly done.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Don't miss this Opportunity

We want One Carpenter or Builder in Every Community to Demonstrate, Take Orders for and Apply Our EDWARDS METAL SPANISH TILE ROOFING on a Liberal Commission.

Here is a chance to build up an independent, profitable business for yourself right at home. Many carpenters are devoting their entire time to selling our metal roofing. Others have made big profits devoting part of their time to selling and laying our Metal Spanish Tile.

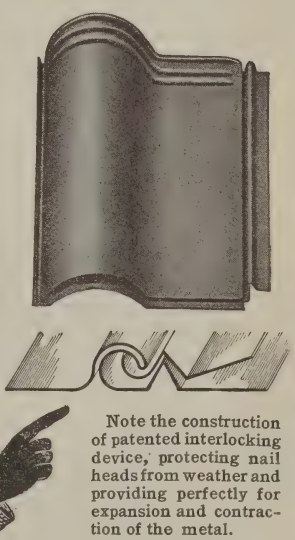
EDWARDS METAL SPANISH TILE

Is being advertised in the leading magazines and is now known to thousands of home builders and owners everywhere. Wherever it has been used it has made a decided "hit" because it shows off to good advantage on the roof and has numerous points of superiority over any other style of roofing.

Architects are specifying Edwards Metal Spanish Tile, for they know it will do away with roofing "troubles." Builders like it because of the finished appearance it gives any house on which it is used.

Our Metal Tile are stamped out of the highest quality Worcester terne plate in exact imitation of the most expensive Terra Cotta Spanish Tile. They come either "dip" painted or heavily galvanized, size 10x14 inches. Our patented interlocking side lock makes it possible to make a perfectly moisture-proof roof without soldering. Edwards Metal Spanish Tile afford the fireproof advantages of Terra Cotta Tile, but are much lighter in weight, cost but a trifle more than ordinary roofing and will last a lifetime.

WRITE US TODAY ABOUT YOUR TERRITORY. Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that someone else will be given your territory. DON'T DELAY. WRITE TODAY FOR OUR SPECIAL AGENTS' PROPOSITION.



Note the construction of patented interlocking device, protecting nail heads from weather and providing perfectly for expansion and contraction of the metal.

The Edwards Manufacturing Co.

"THE SHEET METAL FOLKS"

430-450 Eggleston Avenue CINCINNATI, OHIO

The World's Largest Metal Roofing, Metal Shingles and Metal Ceiling Manufacturers.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

LUFKIN

Steel Measuring Tapes

With Instantaneous Readings can be used at all times and under all conditions with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catalogue No. 12.

THE LUFKIN RULE CO.

SAGINAW, MICHIGAN, U. S. A.

NEW YORK - - - - WINDSOR

ARCHITECTURAL DRAWING MADE EASY

By I. P. HICKS

94 pages, illustrated and cloth bound, $1.00 postpaid. The best yet on drawing plans. Your money back if you are not satisfied with this book. Get a copy of

HICK'S ESTIMATORS' PRICE BOOK and your troubles in estimating are over.

170 PAGES—CLOTH BOUND—PRICE $1.00

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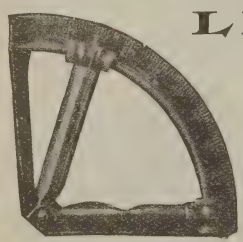

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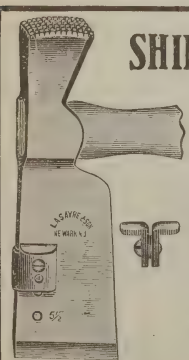

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A NAT. BUILDER

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

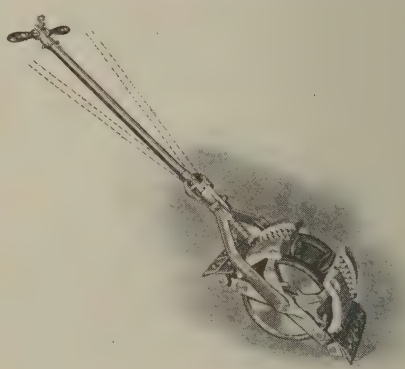
The numerous examples given in this catalogue would seem almost incredible were it not possible to verify every one of the statements made. The fact that these men have risen to the positions of trust which they occupy should be an incentive to others to investigate the methods by which they acquired their education.

The International Correspondence Schools, Box 1332-F, Scranton, Pa., are anxious to show carpenters, mechanics and contractors how they may similarly improve their condition.

THE WEBER DOUBLE ACTING FLOOR SCRAPER.

The general use of hardwood floors not only for residences but for stores, office buildings, ball rooms, bowling alleys, etc., has made it necessary that these surfaces be very highly finished. To do this properly as well as economically, some form of machine scraper must be used. Hand scraping is out of the question.

The Weber Mfg. Co., 661 Seventy-first avenue, West Allis, Wis., have perfected a double acting floor scraper which embodies several improvements not found on other machines. To begin with, the scraper is double acting, scraping both on the forward and backward strokes. This permits a saving in time, while the other adjustments permit of the most accurate and complete work over the entire floor, close to the base boards, without marring them in the least. For the benefit of different mechanics, the handle is adjustable for various heights. For scraping different woods, the knife blade can be adjusted to different angles.



The Weber Double Acting Floor Scraper.

With the Weber scraper it is possible to leave a perfectly level surface on such work as bowling alleys, which of course require an absolutely perfect job. The manufacturers claim that when their bowling alley scraper is used, daylight cannot be seen under a steel square.

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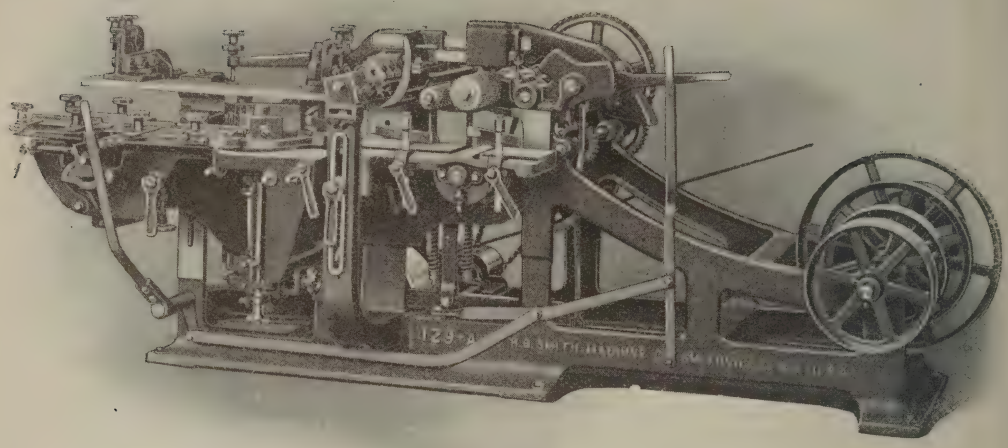
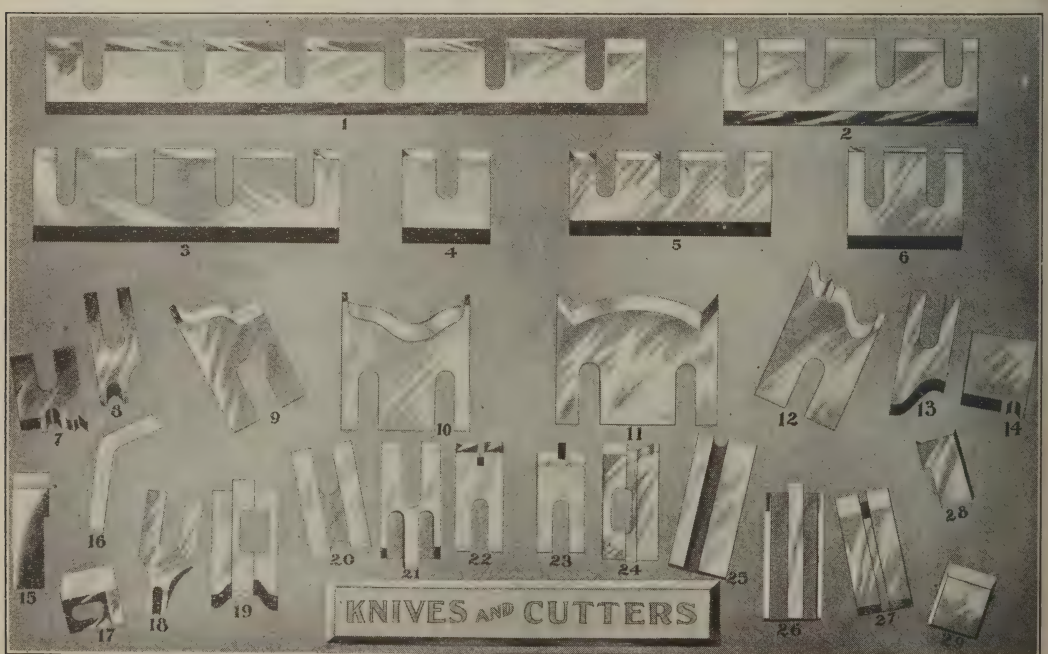


A NEW MOLDING MACHINE.

The H. B. Smith Machine Co., Smithville, N. J., are placing on the market a new molding machine known as their No. 129-A. This machine, as shown in the accompanying cut, is made to take work up to six inches, and as is customary with the Smith machines, embodies all of the latest improvements for turning out the highest class of molded work. The adjustments on this machine render it particularly valuable for all kinds of wood, the speeds being adjustable from seventeen to forty-six feet a minute.

A great variety of work can be done on this machine, some of which may be seen from the forms of the knives and molding cutters, shown on the bottom of this page. The Smith Co. have been particularly successful with their planer knives and cutters, and make knives not only for their own large line of machines, but special knives for others.

Further particulars regarding this machine can be obtained by writing to the H. B. Smith Machine Co., Smithville. N. J.



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How to Sell Amatite

HERE is the argument that sells Amatite to the consumer. Imagine yourself using it and see how effective it is:—

"Yes, I can sell you the ordinary 'rubber' roofings, but of course you will have to paint them every two years to keep them in good order. Amatite has a mineral surface and *needs no painting*. You just lay Amatite on your roof and leave it alone. It takes care of itself.

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"Amatite is made by the biggest company in the roofing business. They couldn't afford to make anything but the best."

These are the kind of arguments that sell goods. Any sensible customer will see the points as soon as the facts are presented. Sample and booklet on request to nearest office.

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Ninety Years Old

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32 POUNDS COATING

ROOFING TIN

Made Continuously Since 1822

but more vigorous than ever. Now made from the new alloy, Copper Bearing Open Hearth Steel, the material which will revolutionize the roofing business.

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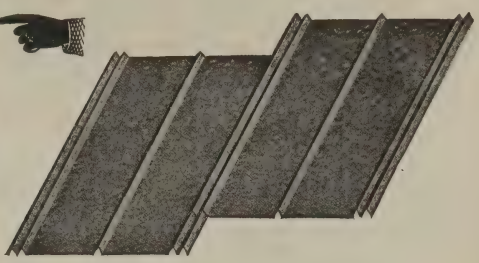

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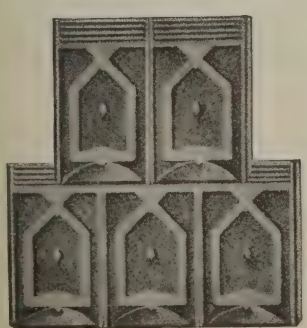
¶ No Wood Strips Required. ¶ Adapted for Residences, Barns, Warehouses, Garages and buildings requiring fireproofing. ¶ Made in all lengths to meet requirements.

STANDARD Lock-Joint METAL SHINGLES

Are the **quickest laid** shingles made, Mr. Contractor and Builder, and they give absolute satisfaction and service. These are proven facts, and don't ignore them. ¶ Our metal shingles are made in either **Painted Tin or Galvanized.** They are twice as quickly applied as those of any other make. In using them you are saving time, and saving time means saving money. Can you afford **NOT** to investigate them? ¶ Our Standard Lock-Joint Metal Shingles have a continuous seal at end of side-lock. It is impossible for rain, snow or sleet to blow up under them. Ours is the only shingle made having this feature. And they lock—lock so that they will always keep in one, and only one position, contraction and expansion being provided.



Let us send you our general instruction roofing booklet. You'll find it very handy to have, and it explains all about our Standard Metal Shingles. Drop us a line about it. It's free. Further: We have an ATTRACTIVE PROPOSITION to make to Contractors and Builders in territory in which we are not represented. Write us regarding terms, etc.

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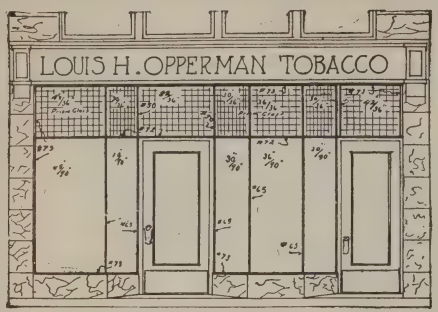

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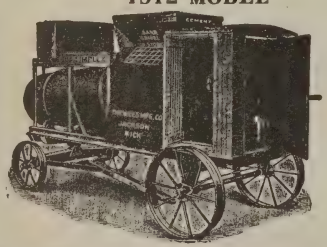

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CARRY YOUR TOOLS IN THE INDESTRUCTO

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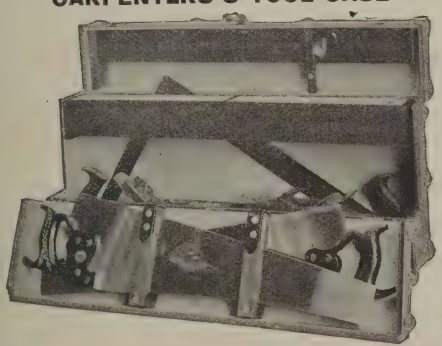

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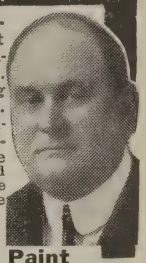

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Send to **The Travelers Insurance Company, Hartford, Conn.,** for particulars. We will show you how to do it.

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Send particulars. My name, address and date of birth are written below.

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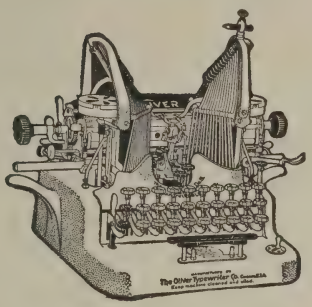
This certainly places a premium on *pennies*! It recognizes *honesty* as a *commercial asset.*



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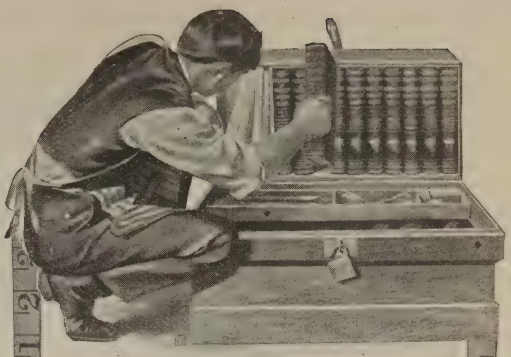

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The most expert carpenter can't do a good job with poor tools, yet the most completely equipped tool chest won't make a good workman of a man who has neither ability or skill. Ability and skill are the results of a complete knowledge of your work—knowledge that can be gained only by hard study and practical experience—the very foundation of your success. The American Scoool's great new

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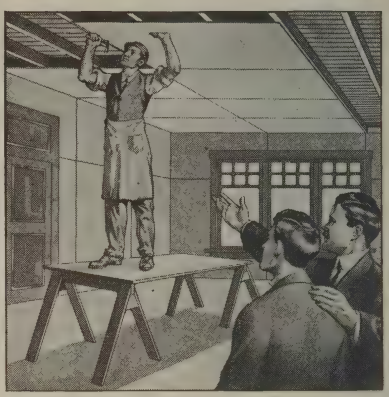
Millions of square feet of this remarkable wall material are being used.

It is now generally recognized by builders that Bishopric Wall Board is the ideal interior for the 20th century building. It does away with all the old plaster troubles, crumbling, dampness, etc. — makes a finer, smoother and far more durable wall and costs much less to put on. The fact that it saves a month's time in completing an ordinary building strongly appeals to builders.

Home owners are delighted with its beauty, economy and wonderful durability.



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Sheets nailed direct to the studs. Walls and ceilings then ready for paper, paint, burlap or kalsomine.

Saves Time and Labor

BISHOPRIC WALL BOARD

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Better Than Lath and Plaster

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You never find the rotting, germ-breeding dampness so common to plaster in Bisnopric Wall Board. It is as dry, clean and sweet twenty-five years afterward as the day it was applied.

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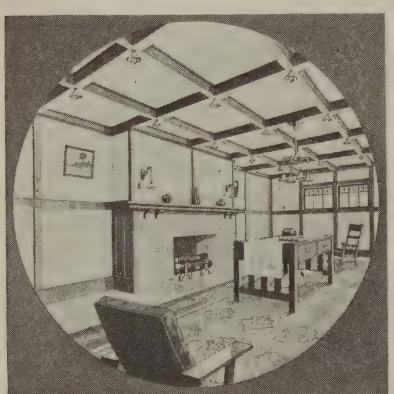

Room furnished with Bishopric Wall-Board. Bishopric Wall Board lends itself to Artistic Panel Effects.

The Bishopric System does away with the exasperating delays that have heretofore been regarded as necessary evil. No weeks of waiting for plastering to dry.

It is applied dry in any kind of weather. It comes in sheets four feet square. Any man who can drive nails can put it on, and it is ready at once for any kind of wall decoration—paint, paper, burlap or any other wall textile. Nothing else equals it for the popular Mission panel interior

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The binder of Bishopric Wall Board is Asphalt-Mastic (toughened asphalt).

Kiln-dried dressed laths are imbedded in the hot Asphalt-Mastic, which keeps the wall board rigid, flat and substantial for all time. The exposed side is smoothly surfaced with heavy fiber-board. This process of manufacture is protected by patent.

Sales Now Over a Million Square Feet Per Month

Bishopric Wall Board is firmly established as a standard building material.

Leading dealers in every community sell and recommend it. Our $5,000 Anti-Warp Guarantee is given on every sheet of Bishopric Wall Board.

Bishopric Wall Board is adapted for **universal use** as a substitute for lath and plaster. Use it for finest residences, for cottages, bungalows, store buildings, schools, churches, summer resort buildings, garages, etc., etc.

Use it for remodeling old houses, for converting waste, attic or basement space into artistic, **usable** rooms.

Book and Sample Free to Carpenters and Builders

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The Mastic Wall Board and Roofing Mfg. Co.

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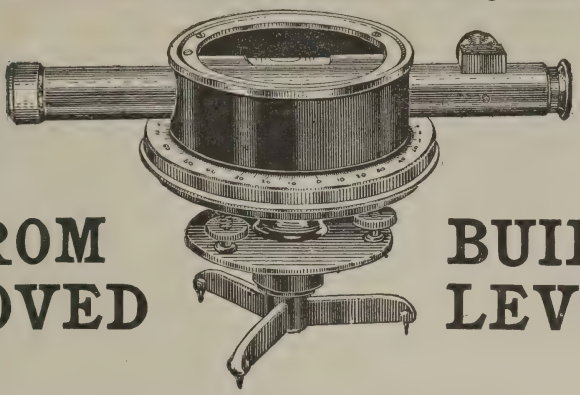
Unanimous Endorsement of purchasers in EVERY STATE and practically EVERY COUNTY in the Union makes it the duty of EVERY MAN who has need for a Leveling Instrument to INVESTIGATE the



BOSTROM IMPROVED BUILDERS LEVELS

whether he is now in the market or not, as the novel elements of construction entering into the **BOSTROM LEVEL** afford **means** for **proving** the **accuracy** of your work which we GUARANTEE is not surpassed in even the most expensive engineering instruments, and that feature when combined with their **simplicity** affords ease and quickness of adjustment and operation which marks the greatest improvement made in leveling instruments during the last quarter of a century.

That Bostrom's Levels fill a long felt want among all classes requiring the use of a dependable instrument, is best indicated by the demand already created throughout the continent which has resulted in our manufacturing in such quantities as to save the purchaser about **one-third** the cost of the old familiar type architect level, as the price of our No. 3 is only $25.00 and No. 4 only $30.00; either outfit, including tripod, graduated rod, target, plumb-bob, etc.—the only difference being in the magnifying power of the telescopes, No. 3 being 10 diameters, and No. 4 being 18 diameters. Prices named are F.O.B. New York, Atlanta, St. Louis, and all Pacific coast cities. Shipping weight 15 pounds.

If not sold in your town, will ship direct on receipt of price; or will ship C. O. D. SUBJECT TO APPROVAL—money back, including all express charges paid, if dissatisfied, or disappointed in any respect after thorough trial. Order direct from this announcement or write for illustrated description. Our reliability guaranteed by this publication.

BOSTROM-BRADY MANUFACTURING CO. 126 MADISON AVE. ATLANTA, GA.

THE COAST LINE TO MACKINAC

D & C LAKE LINES

DETROIT CLEVELAND BUFFALO NIAGARA FALLS

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THE CHARMS OF SUMMER SEAS

Spend your vacation on the Great Lakes the most economical and enjoyable outing in America.

Daily service is operated between Detroit and Cleveland, Detroit and Buffalo; four trips weekly between Toledo, Detroit, Mackinac Island and way ports; daily service between Toledo, Cleveland and Put-in-Bay.

A Cleveland to Mackinac special steamer will be operated two trips weekly from June 15th to September 10th, stopping only at Detroit every trip and Goderich, Ont., every other trip.—**Special Day Trips Between Detroit and Cleveland, During July and August.—Railroad Tickets Available on Steamers.**

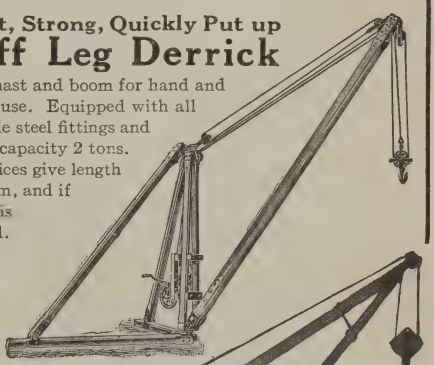
Send 2 cent stamp for Illustrated Pamphlet and Great Lakes Map.

Address: L. G. Lewis, G. P. A., Detroit, Mich.
Philip H. McMillan, Pres. A. A. Schantz, Gen'l Mgr.
Detroit & Cleveland Navigation Company

Light, Strong, Quickly Put up

Stiff Leg Derrick

split mast and boom for hand and power use. Equipped with all crucible steel fittings and gears, capacity 2 tons. For prices give length of boom, and if winch is desired.

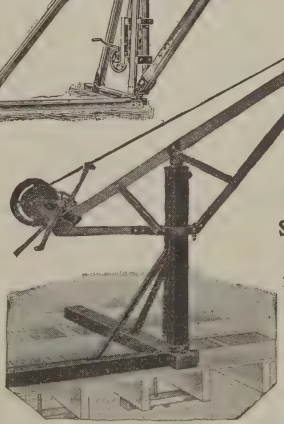


Sasgen Circle Swing Reinforced

Builders Derrick

$45.00

complete ready for use with geared winch, 150 ft. 5-16″ cable, block fasteners, etc., capacity 2500 lbs.



Our Motto: Satisfaction or no Sale.

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Write for Catalog "N"

SASGEN BROS. 2053-57 Racine Ave., **CHICAGO**
New York Office, 103 Park Ave.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT. BUILDER

ÆTNA-IZED?

WHY NOT BE ÆTNA-IZED WITH A TEN DOLLAR BILL

Ten Dollars will insure you for one year under the famous

ÆTNA TEN DOLLAR COMBINATION

In extent and variety of protection without a rival. For $10 this policy pays

$2,250.00 for death from travel or burning building accident

1,250.00 for death from ordinary accident

250.00 for death from natural causes. Paid at once upon receipt of certified copy of official certificate of death.

It also pays liberally for loss of limb or sight, and provides weekly indemnity for accidental injury that results in total or partial disability. The payments for accidental loss of life, limb or sight increase each year without additional cost, and make a possible payment of $3.250.00.

$3,250.00 Insurance for $10.00

Send in the coupon to-day

Ætna Life Insurance Co. (Drawer 1341) **Hartford, Conn.** Tear off

I am under 65 years of age and in good health. Tell me about ÆTNA Ten Dollar Combination. My name, business address and occupation are written below.

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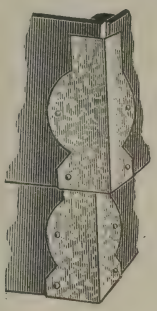
More Profit For You.



You can now give your customer the popular mitre-corner effect without the slow, careful work of cutting and fitting bevels.

Use Metal Building Corners

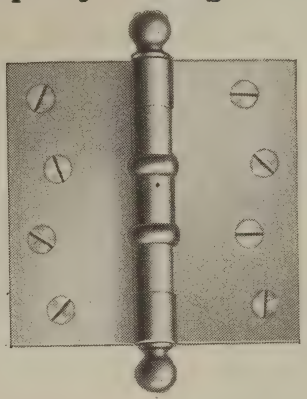
They take the place of corner boards. Save fully $2 worth of time in finishing each corner, make a stronger and neater job.

WRITE FOR FREE SAMPES TODAY.

F. D. KEES MFG. CO. BEATRICE, NEB. Box 811

If you've never used Gossett Hinges for full length window screens, say so and we'll send you a sample pair free.

Properly Hung Doors



which will open softly and smoothly, without friction, can be obtained by using

STANLEY'S Ball Bearing Hinges

with non-rising pins

Write for Circular "N." It tells the whole story.

THE STANLEY WORKS

NEW BRITAIN CONN.

THE EXCELSIOR DUMB WAITER

Sent Complete to a Nail $18.50

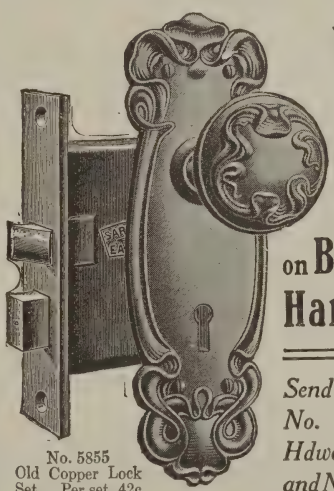
Knocked Down, Ready To Erect

Self Retaining Machine. Hardwood Car. Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one.

Send for Descriptive Pamphlet

R. M. RODGERS & CO.

74 Emerson Place, Brooklyn, N. Y.



No. 5855
Old Copper Lock
Set. Per set, 42c

We Can Save You Money on Builders' Hardware

Send for Rehm's No. 5 Builders' Hdwe. Catalog and Net Price List

Sent Free to Contractors and Material Men. When sending for this book please state whether Carpenter, Contractor or Material Man.

We do not sell to Contractors or Carpenters in Cook County, Illinois

REHM HARDWARE COMPANY

1503 Blue Island Ave. CHICAGO, ILLINOIS

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Investigate Before You Buy

and you will find we can save you lots of money on anything in the line of HIGH-GRADE sash, doors, frames, blinds, mouldings, inside trim, grilles, colonnades, stair and porch work, mantels, grates, tiling, art glass, paints, roofing and building papers, wall boards, hardware, hardwood and parquetry flooring, rolling partitions, screens, steel ceilings, gutters, shingles, etc.

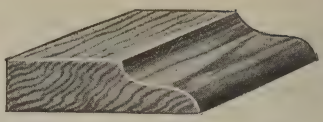
WINDOWS
42c and up

Our new catalog mailed free will convince.

Prompt shipments and materials all first-class.

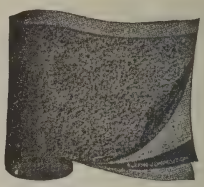
Let us send you our SPECIAL FIREPLACE CATALOG—showing unusual values.

The Huber Builders Material Co.
39-43 Vine Street CINCINNATI, OHIO



WINDOW BEAD
Best Yellow Pine
27c per 100 lineal feet

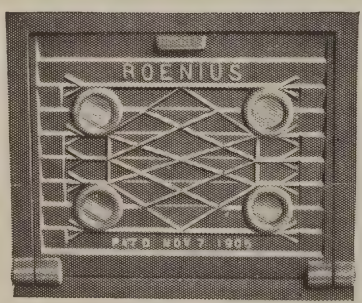
STAIR NEWELS
$1.50 and up



ROOFINGS
64c and up

HARDWOOD MANTELS
$3.58 and up

PORCH NEWELS
42c and up



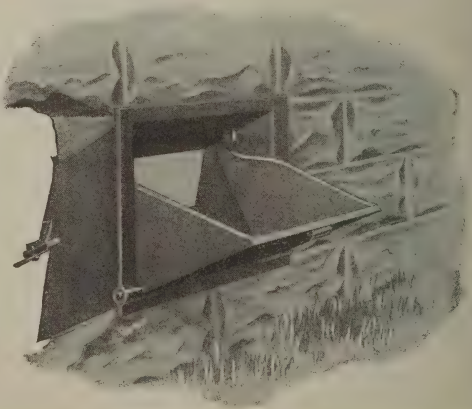
Roenius Wood and Coal CHUTES

Have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed.

Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked.

Roenius style B Chutes are made with glass discs—and this chute is used especially in cases where the only available light must pass through the coal chute.

Ask your dealer for the Roenius—and get the best.
Write for Circulars and Prices.



GRAND RAPIDS FOUNDRY COMPANY
MANUFACTURERS
Grand Rapids, WISCONSIN

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BUY FROM THE MAKER

¶ We have made and sold thousands of steel furnaces in Chicago, and we have sold them everywhere, by mail, direct to contractors, builders, and house owners, all over the country, from Maine to China. We don't offer them through dealers, for the DIRECT DEAL with the consumer is the most satisfactory to all concerned. It means BETTER SERVICE—because of the direct interest of the maker in each contract—and it means BETTER PRICES, for the middlemen's profits are cut out.

¶ **In buying** the Hess Furnace, **you needn't have faith.** You can buy it now, on trial, and test it before January 1st, 1913. We will deliver it at your station, with all pipes and registers—freight prepaid.

¶ **Set it up and use it.** If you're not pleased; not sure you have big value for the price—send it back to us—we paying return charges—and we won't claim one cent from you.

¶ **We don't offer you credit, however,** for we require the price to be deposited with your local banker when you receive the goods. He holds it till the test is made, subject to the conditions outlined above, and gives it to you or to us, according to the result of the test. You take no risk, and you will save money.

¶ **Our furnace is made of steel,** EVERY SEAM WELDED, and therefore permanently gas—dust—and smoke—tight. Made in six sizes, and burns any fuel. There is no furnace better, at any price.

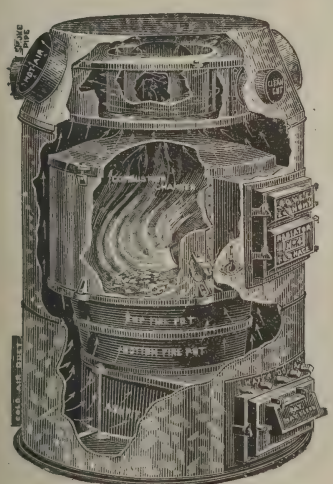
¶ **Our 48 page booklet on furnace heating is free. Ask for one. It will give you a lot of useful information on heating.**

HESS WARMING AND VENTILATING CO.

907 TACOMA BUILDING, CHICAGO

WE MAKE THOSE BEAUTIFUL WHITE STEEL MEDICINE CABINETS; CHEAPER THAN WOOD

Bovee Furnaces at Manufacturer's Prices



Bovee's Economy Furnace.

Saves 50 per cent of Cost; 40 per cent of Fuel. Most Durable, most Economical Furnace Sold. Has a perfect ventilating system for every part of building.

RESIDENCE HEATING PLANT

Hot air registers in five rooms, cold air return in two rooms, 40 in. Furnace, 20 in. Fire Pot, 28 in. Combustion Chamber, 10,000 cubic ft. Heating Capacity.

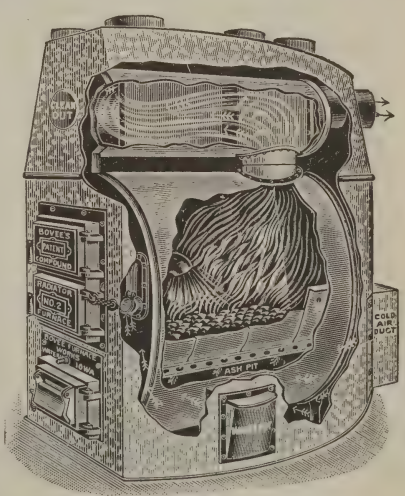
Special Price, $65.00

CHURCH AND SCHOOL HEATING PLANT

One large hot air, two cold air registers, 54 in. Furnace, 32 in. Fire Pot, 40 in. Combustion Chamber, 40,000 cubic ft. Heating Capacity.

Special Price, $95.00

Horizontal Furnaces with large doors or larger furnaces and more piping at proportionately low prices.



Bovee's Horizontal Furnace.

SEND FLOOR PLANS FOR FREE ESTIMATE

Bovee Grinder and Furnace Works, 60 8th Street, Waterloo, Ia.

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The Recessed Steel Medicine Cabinet

MEDICINE
HESS SANITARY LOCKER
CABINET

The Only Modern, Sanitary, STEEL Medicine Cabinet

or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves. Costs Less Than Wood.

Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned. Should Be in Every Bath Room. Four styles—four sizes. To recess in wall or to hang outside. Send for illustrated circular.

HESS, 907 L Tacoma Bldg., CHICAGO

Makers of Steel Furnaces. *Free Booklet.*

The Outside Steel Cabinet

Specify the Jahant Down Draft Furnace

Write for Terms and Free Furnace Handbook

OUR SERVICE DEPARTMENT

will cooperate with any Builder, Contractor or Architect who wishes to specify or install a dependable heating equipment. The **Jahant Down-Draft Furnace** solves the heating and ventilating problem for residences, schools, hotels, churches, and similar structures. Our 365 day "Guaranty Bond" given with every furnace insures absolute satisfaction. Send us details, sketches or blue prints of the building to be erected, and we will furnish without cost special plans, specifications and blue prints of a

JAHANT
DOWN-DRAFT
FURNACE

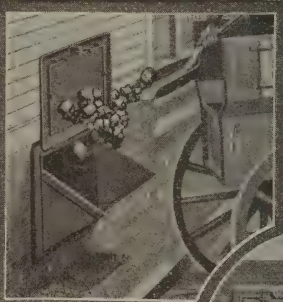
guaranteed to furnish plenty of heat at a minimum cost for fuel. If you include the Jahant in your finished plans we will pay freight on the complete shipment of furnace, pipes, registers, all fittings and the necessary tools.

Write for our free Specification Hand Book. It tells more about the Jahant and our co-operative plan.

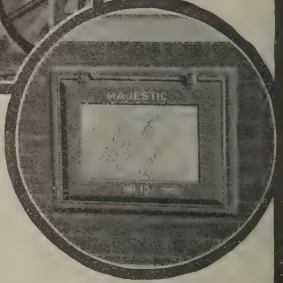
THE JAHANT HEATING CO.
90 Mills St., AKRON, OHIO

Furnace Builders for over 30 Yrs.

MAJESTIC
FOUNDATION
COAL CHUTE



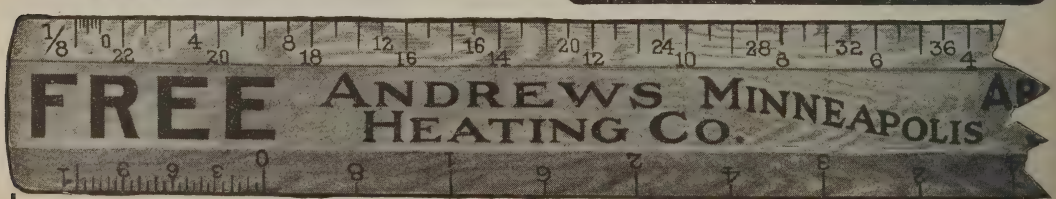
¶ Protects the building just where most needed—above the opening.
¶ The heavy steel hopper catches all the coal.



¶ When not in use, the hopper lies in the bottom of the chute body. ¶ The door locks automatically either open or closed. Strictly burglar-proof. ¶ With ¼ inch wire glass or steel panel in door.

Write for circular and address of nearest dealer

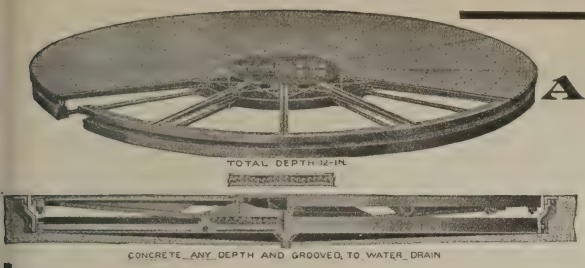
Majestic Furnace Co.
70-74 Erie St. Huntington, Indiana



Architect's Scale SEND US TWO OR MORE NAMES of persons who are interested in or want to buy Hot Water Heating Plants and we will send you this scale. Back inches are divided into 6, 10, 12, 16, 20 and 40 parts. Also free catalog on request. Name this paper when writing.

ANDREWS HEATING CO., 1287 HEATING BUILDING MINNEAPOLIS, MINN.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



"UNIVERSAL" Auto-Turntables

Made in four sizes to take any size cars. The serpentine ball bearing race course makes them so easy to operate that a child can turn them. Adaptable for installation on ground or upper floors; easy to install. Write for complete catalog "C-5" and further information.

Don't you want our Booklet "B-5" on our line of Builders' Supplies—coal chutes, sidewalk, doors, etc.

THE CANTON FOUNDRY & MACHINE CO., Canton, Ohio

Buy your Plumbing Direct from Hardin—You will find both Quality and Prices Right

$16.85 For This $28. Outfit

Take this Long Back One Piece Sink for example

Why not order one for your own home—it will improve the looks of any kitchen—it will make the housewife's work easier—everyone likes this sink.

Write for Free Catalog

which shows a splendid line of modern Bathroom Outfits, from $38.95 to $175.00, Water Pressure Systems, Hot Water and Steam Plants, and an endless assortment of pipe, valves, fittings, etc. Everything high class and strictly guaranteed.

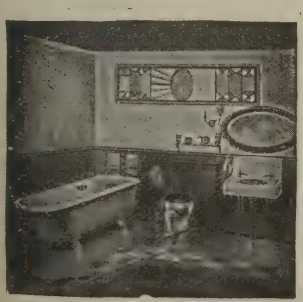
This is a new designed Porcelain Enameled Roll Rimmed Sink, having Back and Drain Board all in one piece—Wall Hanger, Adjustable Legs, Concealed Galvanized Air Chambers, Nickel-plated Strainer, Fuller Adjustable Flanged Bibbs and "P" Trap, with waste to wall. Sink is 20 x 30 inches, with 20 x 24 inch counter, sink drain brass; 12 inch back extending over sink, and runboard all in one piece.

This low price of $16.85 includes two $1.50 Faucets, and the large 1½ inch Trap. Better send in your order now—while we have these sinks in stock.

JOHN HARDIN CO. EUGENE A. HARDIN Manager

Doing Business for 25 Years at the Same Old Address and in the Same Square Old Way of Treating Our Customers

4541-4549 COTTAGE GROVE AVE. CHICAGO, ILL.



Full Line of Plumbing Supplies

Sold Direct at Wholesale Prices

20 to 40 per cent Saving

Complete bathroom outfits—tubs, closets, lavatories, kitchen sinks, etc. Prompt shipment from a complete stock. The only house selling up-to-date, guaranteed goods at wholesale direct. Write for illustrated catalogue and prices.

B. Y. KAROL, 768-72 W. Harrison St., Chicago, Ill.

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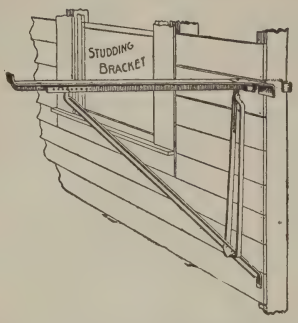


THE "DETROIT" FOLDING SCAFFOLD BRACKET

COMBINES ALL GOOD FEATURES

SAFE: Owing to its peculiar construction, the load strain is entirely Downward with no tendency to pull outward from the building.

CONVENIENT: Its automatic and positive grip makes it possible to set up in 15 minutes without bolts, screws or nails.

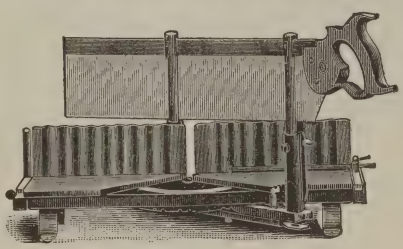
ECONOMICAL: No builder can afford to be without it because its cost can be saved on a single contract.

MADE FOR EITHER STUDDING OR SHEATHING

FOLDING SCAFFOLD BRACKET CO.

50 Fort Street W. **Detroit, Mich.**

GOODELL MITRE BOX



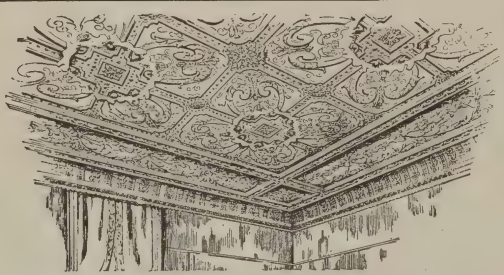
MADE OF STEEL — CANNOT BREAK

First in Quality and Improvements

Automatic stops for holding up saw. Corrugated Backs. Graduated. Gauge for duplicate cuts and many other features. If you want the best you will take no other.

SEND FOR CIRCULAR E

GOODELL MFG. CO. GREENFIELD, MASS.



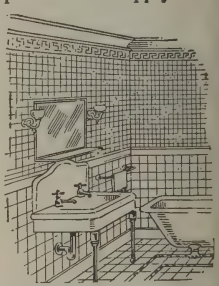
METAL TILING

For the Kitchen and Bathroom Carpenters Can Apply It

METAL CEILING

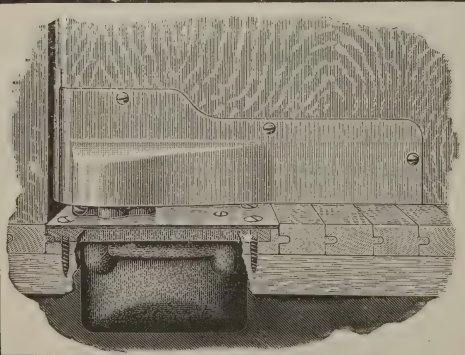
Something exceptional—out of the ordinary class—and as plain or elaborate as you like.

Patterns especially adapted for residence work. Nothing better for a new house, or to repair an old one. Catalog.



NORTHROP, COBURN & DODGE CO.

30 Cherry Street, NEW YORK



Standard Checking Hinge

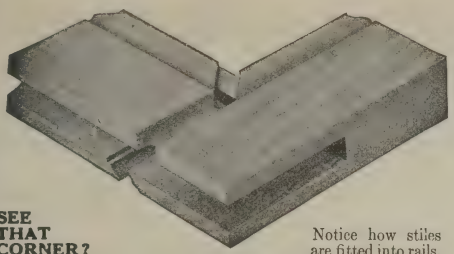
A Checking hinge for double-acting doors between dining room to pantry or kitchen, etc.

It is a door check and hinge combined.
It automatically closes the door without a slam.
I prevents children from being knocked down.
It prevents injury to hands if caught when door is closing.
It stops door exactly at center.
It holds door open automatically when desired.
It renders the action of door absolutely noiseless.
It will outwear three of the spring hinges now in common use.

For Sale by Hardware Dealers

THE STANDARD MFG. CO., Shelby, Ohio, U.S.A.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



SEE THAT CORNER?

Notice how stiles are fitted into rails.

MADE TO ORDER

Fly Screens and Screen Doors

We use the best grades of wire, black enamel, galvanized, pearl and copper bronze, fastened by the improved **Standard Shoulder Strip Method,** which makes the wire drum tight and firm, can not sag or pull away.

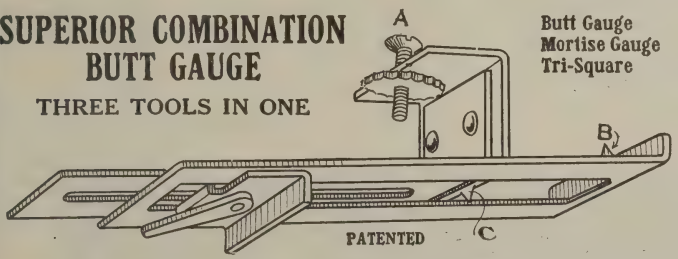
Dealers, Carpenters, Contractors and Builders, write for a free copy of our 1912 illustrated catalog

STANDARD SCREEN CO., 1848-50 W. 14th Street **Chicago, Ill.**

Our screens are all mortised, tenoned, joined with waterproof glue and pinned with steel pins, will last a lifetime

SUPERIOR COMBINATION BUTT GAUGE

THREE TOOLS IN ONE



Butt Gauge
Mortise Gauge
Tri-Square

The only Butt Gauge on the market that can be applied to both **Rabbet** and **Stop Jamb** work.

Carpenters and Cabinet Makers can perform more work with greater ease than with any other Butt Gauge on the market.

Cut out this advertisement, take it to your dealer, and if he cannot supply you, send us **85c** (P. O. or Express Money Order) and we will mail you one postage paid.

MANUFACTURED AND SOLD BY

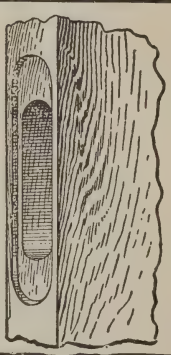
THE GILLIAM MANUFACTURING COMPANY, Canton, Ohio

Universal Lock Mortiser

No builder should be without one.

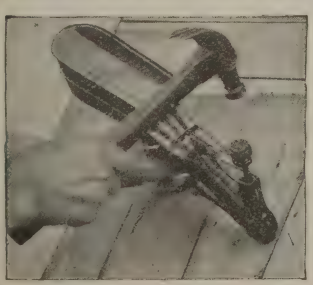
Will cut lock mortises, **including setting in of face plate,** of any desired size, in hard, soft or crossgrained wood in from 3 to 6 minutes. No boring required. Every machine guaranteed. Makes a perfect job. Easily operated. Testimonials and descriptive booklets furnished on application to

UNIVERSAL LOCK MORTISER CO.
Geo. O. Rogers, Sales Manager
3404 Alliquippa St. Pittsburgh, Pa.

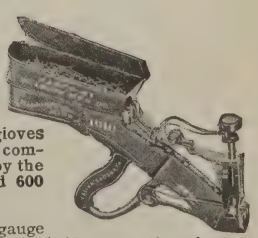


Showing lock mortise cut, including face plate setting

PEARSON'S AUTOMATIC SHINGLE NAILER



Pays For Itself on One Fair-sized Shingling Job



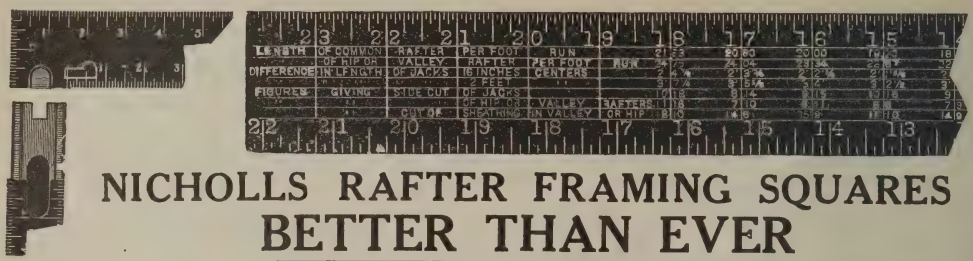
Works well on roofs of any pitch. You can wear gloves or mittens and drive nails faster and with more comfort than the old way. Just throw the nails in by the handful (Nailer holds easily between 500 and 600 nails in the top), and start nailing.

PEARSON NAILERS are made in two sizes.

The Blue Nailer is for common 3d, No. 14 gauge wire nails, and the Red Nailer is for the **galvanized** 3d, No. 13, 1¼ in. wire nails. Order from your dealer or send **$5.00** for either one—express prepaid. Money cheerfully refunded if Nailer is not as represented. *Write for Circular "N"*

PEARSON MFG. CO. ROBBINSDALE, MINN.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



NICHOLLS RAFTER FRAMING SQUARES
BETTER THAN EVER

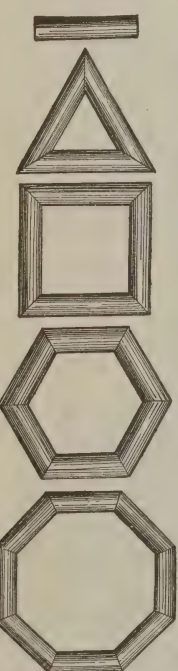
Full directions for using Rafter Framing Rule stamped on back of square, making a complete tool within itself. No direction sheet needed.

MANUFACTURED IN BOTH SOLID AND TAKE-DOWN STYLES

Send for our little book telling you how to get the lengths and cuts of common, hip, valley and jack rafters for seventeen different pitches of roof.

DON'T DELAY—SEND TODAY

NICHOLLS MFG. CO. - - Ottumwa, Iowa



Mitres cut with the Red Devil by an amateur

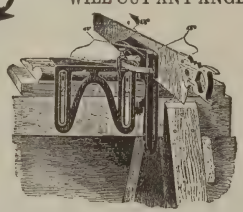
The Improved Red Devil Mitre Box

(Improved Feb. 1912)

What it will do with ANY Saw ANY Place.

SEE THESE MITRES? All absolutely perfect—cuts and accurate joints.

THE RED DEVIL MITRE BOX WILL CUT ANY ANGLE



It's all metal. It weighs 2 lbs.

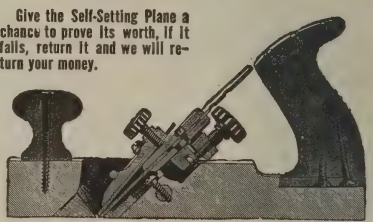
There is no other just as good and you can easily prove it by accepting our

SPECIAL OFFER—On return of this "Ad" and $2.00 one of these Mitre Boxes will be shipped to any reader of "The National Builder." Offer good for 30 days from date of issue.

Smith & Hemenway Co.
Manufacturers
Chambers St., New York, U. S. A.
Red Devil Tools are the Best on Earth

INTRODUCTORY TRIAL OFFER

Give the Self-Setting Plane a chance to prove its worth, if it fails, return it and we will return your money.



If the SELF-SETTING PLANES are not sold in your town and you write us saying, "I saw your trial offer in N. B.", we will send you particulars, a carpenter's pencil and our $1.00 CERTIFICATE, which we will receive as $1.00 in part payment for a SELF-SETTING PLANE, as stated in our $1.00 CERTIFICATE, and if this S. S. PLANE is unsatisfactory and returned at our expense, we will send you $1.00 more than you sent us, as the $1.00 CERTIFICATE says.

As this paper guarantees we will do as our advertisment says, you know the plane must be O. K.

ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained eaty, knurly, knotty, hard or soft wood you can find, THAT IS FREE FROM SAND OR DIRT.

If it is not worth to YOU or YOUR MEN, TWICE ITS COST, return it at our expense, as above stated.

If you send us the addresses of ten carpenters, no matter where they live, we will send you another carpenter's pencil, hard and tough.

Carpenter's Hard, Tough Pencils, 30c per dozen, postage prepaid.

GAGE TOOL COMPANY, Vineland, N. J.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Five Forceful FORD Facts

(Ask for and insist upon the GENUINE FORD)

THE FORD Single Lip Bit will not turn off when boring against the sides of knots or across season cracks; and when necessary to bore at very slight slant with the grain it will not follow the grain but will bore perfectly straight.

It draws in on any wood, even on end grain second growth hickory.

It cuts out with such slight splintering that all FORD users bore straight through all woods, saving two or more turns on every timber.

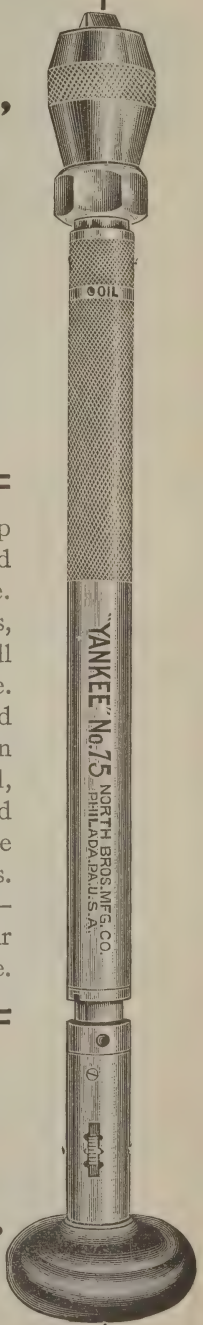
In boring two or more thicknesses of wood, on leaving each piece it does not cut a so-called button but bores as if in solid timber.

It is a better bit than ANY other single lip bit because no other is so well made; and is superior to ANY double lip bit because it does MORE than ANY double lip bit can do.

The above facts are true only of the *GENUINE* FORD. Imitations are inferior both in working and wearing qualities. The name FORD is stamped on each GENUINE bit. If your dealer hasn't it write us. Write us anyway and we'll send you a handy memo. book. Address Dept. 2d.

Ford Auger Bit Co.
Holyoke, Mass.

Another New "Yankee" Push Brace No. 75



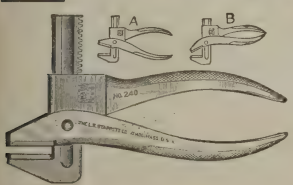
Drives Wood Augers up to ⅜-in. easier and quicker than a Bit Brace. Drives or draws screws, and takes all the small tools used in a bit brace. A fine tool for crowded corners. Bearing down on handle drives the tool, giving it the quick and easy motion of the "Yankee" Spiral Drivers. Built for good service—it's a "Yankee." Let your dealer show you one.

SEND FOR BOOK OF LABOR SAVERS

North Bros. Mfg. Co.
Dept. N
Philadelphia, Pa.

When other Pliers won't

STARRETT



EXPANSION PLYERS
Will.
Will What?

Pull out that headless nail.
Start that rusted nut.
Loosen that stubborn bolt.

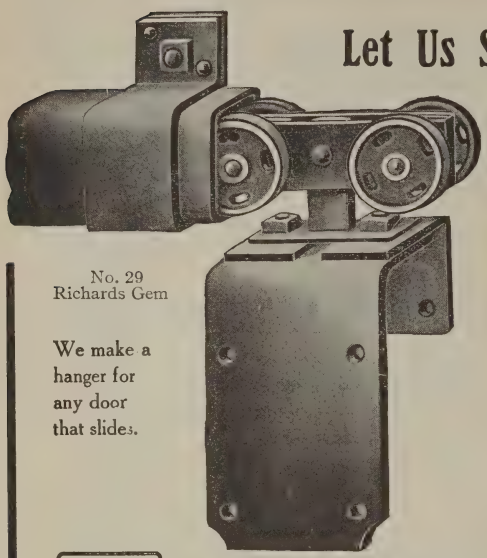
Do a hundred "mean" jobs when other tools won't. See how they're made—the jaws are adjustable, and automatically fit the work. The fulcrum is short, giving tremendous squeeze. The handles are always right distance apart to grip with the hand.

Go to your dealer's and see how the "feel" convinces you of strength and usefulness.

Ask for Catalog 19M.

The L. S. STARRETT CO.
ATHOL, MASS., U. S. A.
NEW YORK LONDON CHICAGO
42-5

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



No. 29
Richards Gem

We make a hanger for any door that slides.

Let Us Solve Your Hanger Problems!

Richards-Wilcox Trolley Hangers are the result of our thirty years of hanger making experience.

The shape of track, trucks, wheels and pendants shows our careful study of your customers' requirements. Don't experiment, get the goods with a backing—a knowledge behind their make.

Sold by the Hardware Trade

RICHARDS-WILCOX R&W AURORA TRADE MARK

This trade mark should be your guide to placing hanger orders.

Have you catalogs?

Richards-Wilcox
MANUFACTURING CO.
AURORA, ILL. U.S.A.

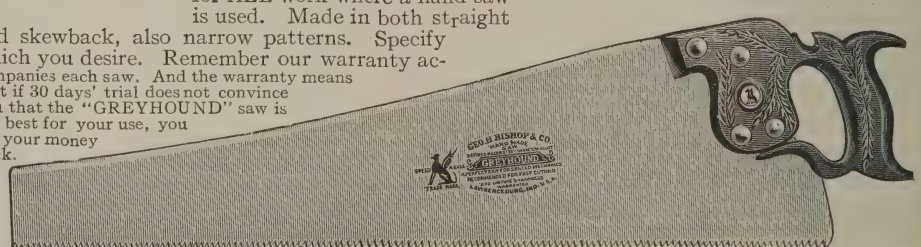
Door Hangers and Hardware Specialties

Greyhound Hand Saws

TRADE MARK.

The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. *This saw will be imitated by others—but not equalled.*

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the best for your use, you get your money back.



Inches,	18	20	22	24	26	28	30	Net.	Packed one
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		in a Box

Order one today and let us take all the risk. If you want literature first, write us

GEO. H. BISHOP & CO., Makers, Lawrenceburg, Indiana

NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

You Don't Lose Time or Money

on the Job Done With an IRWIN Auger Bit and—

You get your money back on an IRWIN if it fails to suit you

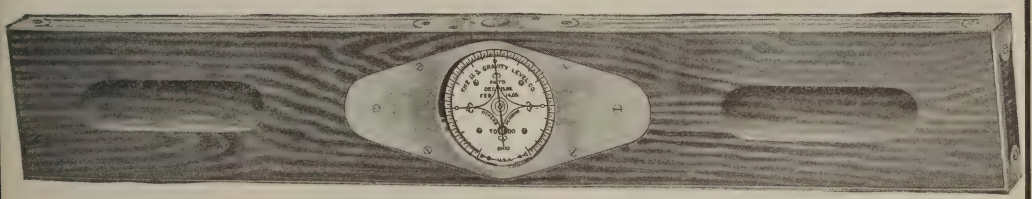
THE only solid-center-stem bit made in all styles and sizes for every use. Sold by dealers everywhere. If you fail to find the **Genuine, Guaranteed IRWIN,** write us.

IRWIN AUGER BIT COMPANY

(LARGEST IN THE WORLD)

STATION G 17 WILMINGTON, OHIO

The Talking Level



Sure, it tells you just what to do. Your old spirit level flickers around and makes you guess. Our level says, "Hey there, you're off just 1-16 of an inch." You shift your level and it tells you when you're exactly right. It points its finger right at the place. That's the end of your work and you know **it's exactly level.** When you see the "U. S." you'll be glad to throw away your old spirit level. Write us at once for our descriptive circular. Full size level shown.

The "U. S." Level Used all over the world by

Railroad Builders	Plumbers	Civil Engineers	Millwrights
Municipal Engineers	Road Supervisors	Contractors	Machinists
Surveyors	Track Foremen	Farmers	Carpenters

THE U. S. GRAVITY LEVEL CO.

Dept. N, Nicholas Bldg., Toledo, Ohio

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

DUMB WAITERS

The best is the best and the cheapest is not always the cheapest. Builders who have used the most dumb waiters and hand power elevators agree that those made by the Sedgwick Machine Works are the best, and if results are considered, that they are the most profitable to handle. Some builders buy the Sedgwick Machines only and build the balance of the outfit themselves. Others find that it is more convenient to let the Sedgwick Machine Works supply the complete outfit, as it is manifestly impossible to make one dumb waiter as cheaply as they can be made a hundred or a thousand at a time.

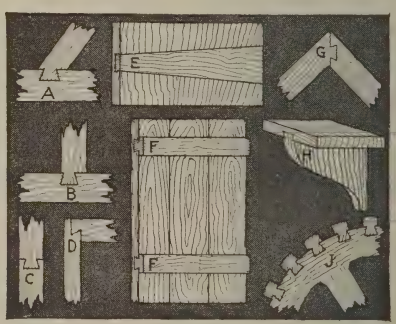
Send at once to the Sedgwick Machine Works, 130 Liberty Street, New York, for their Catalogue "K" which will be mailed you free, and you will then have for reference a catalogue from which you can select just what will best suit your requirements.

Stanley Tools

A Combination Dovetail Tongue and Groove Plane

This Plane will at one setting cut a dovetail groove, and in the other setting a dovetail tongue to match.

A most valuable addition to the kit of Pattern Makers, Cabinet Makers, Carpenters and Woodworkers in general.



A few samples of work that can be done with its use.

A circular containing complete description of the tool, as well as valuable suggestions as to the use of dovetail joints will be mailed upon request. Address

Stanley Rule & Level Co.
New Britain, Conn. U.S.A.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

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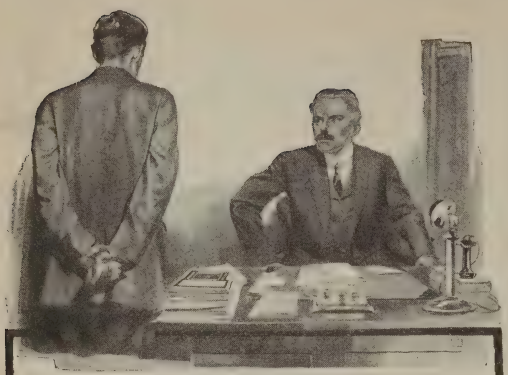

The Importance of Training

Here is a man who was in line for a better job, but, like the great majority, had not been training himself to "fill the shoes" of the man above him; he always thought that if the time ever came he could just bluff it through—special training wasn't necessary. There's where he made *his* mistake, and there's where you will make *your* mistake if you are not a trained man. The boss had only to ask a few questions to find that the man did not know anything about the other fellow's work; that he had been wasting his time instead of improving it—that he was just one of the fellows who get into a rut and stick because he didn't have sense enough to plan for the future.

The time to plan is right now; the opportunity will come when you are ready

The American School of Correspondence was founded to help just such men. It is one of the largest educational institutions in the world. Tell us what you want to be, how much of an education you already have, and how much time you are willing to devote to bettering your condition. We will tell you how you can pay for the course you want by the week or by the month. We will do everything we can to get you started right.

If anyone offered you $500 for two hours overtime every day for a year, you would jump at the chance, wouldn't you? Two hours study every day for the next year or two will mean more than $500—it may mean $1,000; that depends entirely upon yourself.

The American School does not employ agents or collectors to bother you in your home or at your work. It brings a complete college course to you in your own home, and all work is carried on privately and quietly, strictly by correspondence.

Won't you check, fill in, and mail the coupon?

American School of Correspondence
CHICAGO, U. S. A.

OPPORTUNITY COUPON

American School of Correspondence, Chicago, U. S. A.

Please send me your Bulletin and advise me how I can qualify for the position marked "X." N B 7-12.

.....Automobile Operator	.....Lawyer
.....Draftsman	.....Fire Insurance Eng'r
.....Architect	.....Telephone Expert
.....Building Contractor	.....Moving Picture Op'r
.....Structural Engineer	.....Book-keeper
.....Civil Engineer	.....Stenographer
.....Electrical Engineer	.....Accountant
.....Elec. Light & Power Supt.	.....Cost Accountant
.....Master Mechanic	.....Certified Public Acc'nt
.....Sanitary Engineer	.....Auditor
.....Steam Engineer	.....Business Manager
.....Reclamation Engineer	.....College Preparatory

NAME .....

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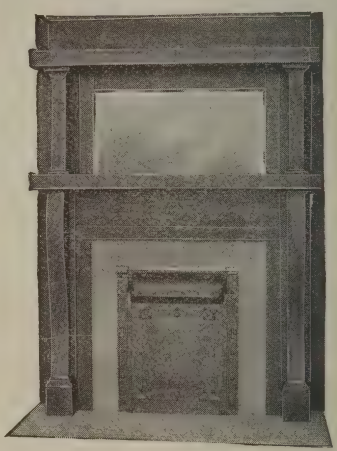
$28.60

For this Elegant, Massive Selected Oak or Birch

Mahogany Finished Mantel

Beveled Mirror, 18x36 inches



No. 875½

"FROM FACTORY TO YOU"

Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns as shown in cut. **Dealers' price not less than $40.00.**

"Reputation and Quality Count"

CENTRAL MANTELS

are distinctive in workmanship, finish and style. Twenty-five years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

CATALOGUE FREE. Will send our new 100-page catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

Central Mantel Company

1237 Olive Street St. Louis, Mo.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

DISSTON SAWS

Have been sold and used continuously for the past SEVENTY-TWO YEARS in ever increasing quantities. This is the supreme test of RELIABILITY.

HENRY DISSTON & SONS

INCORPORATED

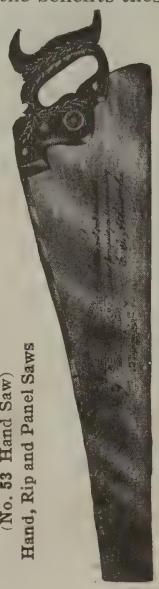
Keystone Saw, Tool, Steel & File Works

Established 1840 PHILADELPHIA, PA.

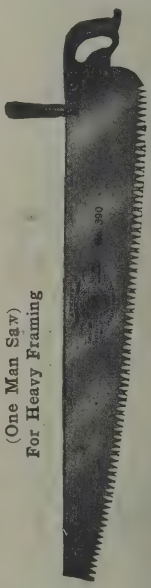
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

ATKINS "SPRING BEAUTIES"

Here are just a few of the tools that you will find invaluable in your kit. They represent the most scientific construction and Highest Quality. Your regular dealer will supply you. Just tell him you want **"ATKINS SILVER STEEL."** He will order from his wholesale house, if he does not have them in stock. Why not "sort up" your outfit—this Spring—now—and enjoy the benefits these really fine **mechanics'** tools will bring?

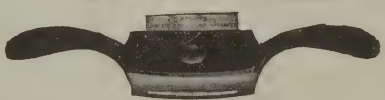


(No. 53 Hand Saw)
Hand, Rip and Panel Saws

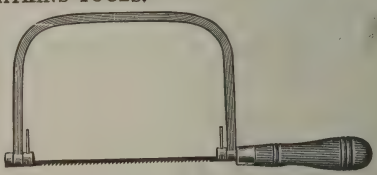


(One Man Saw)
For Heavy Framing

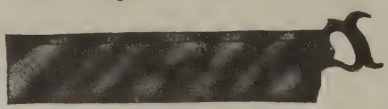
THIS MARK ON ALL GENUINE ATKINS TOOLS.



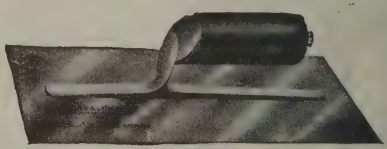
(No. 5 SCRAPER)
Floor Scrapers. Blades of Saw Steel.



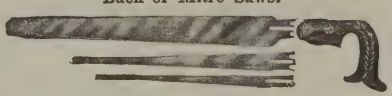
(No. 50 COPING)
Coping or Scroll Saws



(BACK SAW)
Back or Mitre Saws.



(TROWEL)
Trowels Made of Saw Steel



(No. 3 NEST)
Nests of Saws with Metal Cutting Blade

FREE. Send your name and address with ten cents for postage, and we will register you on our list of High Class Mechanics and send you

FREE our Carpenters' Book, called Saw Sense, a handy monthly Time Book with wage scale, and a fine carpenters' nail apron.

E. C. ATKINS & CO., Inc.

The Silver Steel Saw People. **INDIANAPOLIS, INDIANA**

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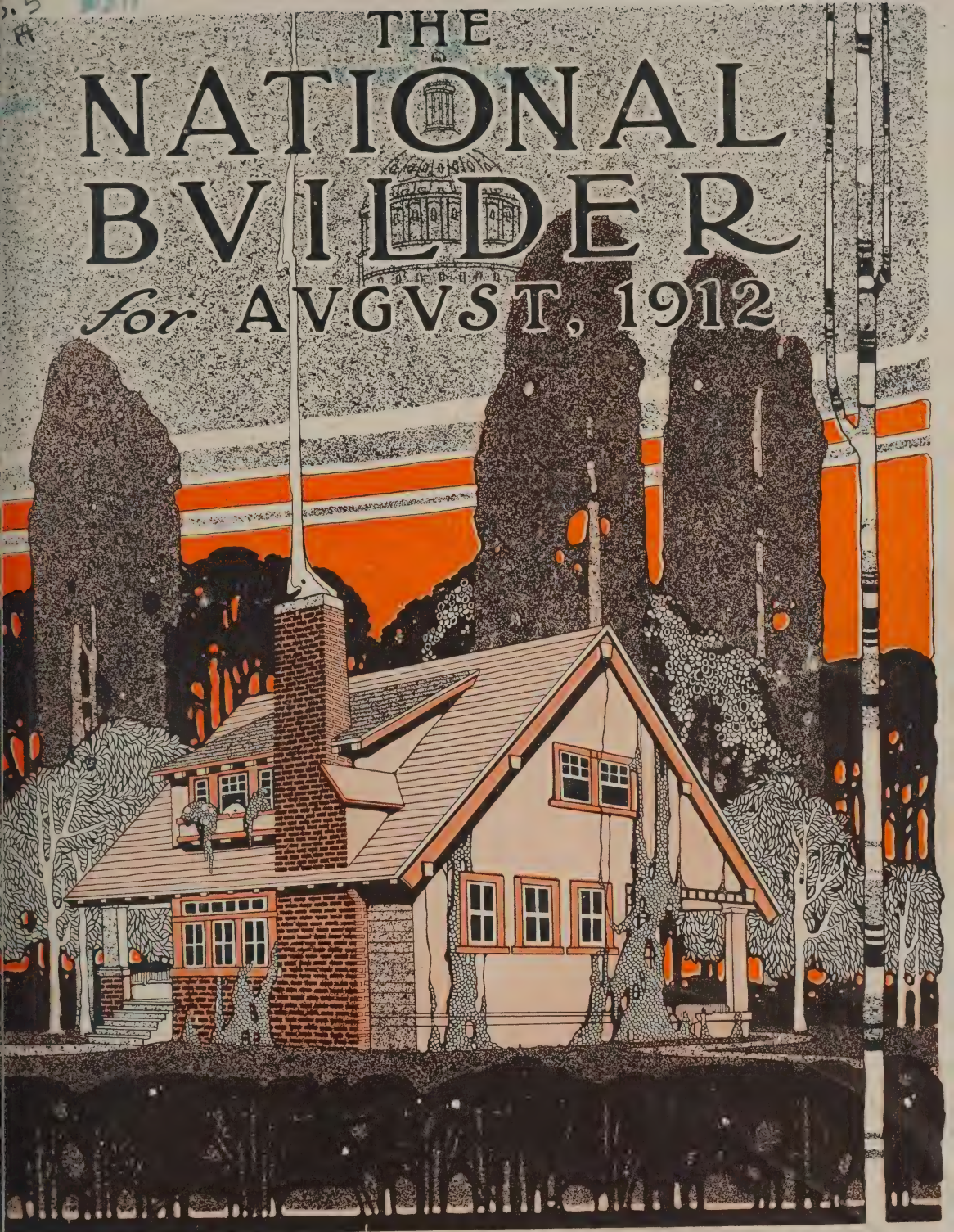
IT WILL HELP.

THE NATIONAL BVILDER

for AVGVST, 1912



Cottage at Elyria, Ohio. John Henry Newson Architect

for WORKING PLAN *and* ESTIMATE OF THIS HOUSE

EE SUPPLEMENT *and* PAGES 35-36-37

8TH YEAR ▪ PRICE 15 CENTS

ORTER-HODGSON CO. *Publishers*

A Man Is Known By the Tools He Uses

If he can take pride in his tools, his *work* is generally worth taking pride in—

THE NEW

Russell Jennings Precision Tools

with turned shanks, are tools that any man will be proud of, and the results he can produce with them will certainly please him. These tools are the well-known

Russell Jennings Bits

with the correct double twist, extension lip, and screw point, and *with the new turned shank.*

Other Precision tools are a new solid head expansive bit, with a cutter that can't creep, a bit extension that stays in line and can't pull out of the brace chuck, and screwdrivers, countersinks, etc.

These tools may be bought in sets, packed in neat boxes, very convenient to take out on a job. Sets contain brace, bit extension, expansive bit, auger bits from $\frac{4}{16}''$ to $1''$ by $\frac{1}{16}''$, screwdrivers and countersinks.

SEND FOR FREE BULLETIN

Russell Jennings Mfg. Co.

CHESTER, CONN.

21-83

NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Few Hours' Time Makes Room Ready for Occupancy

"I Make More Money Handle More Jobs

Please Every Customer and Gain a Month's Time on Every Building Job by Using

Bishopric Wall Board"

The Start **The Finish**

A well-known builder says:

"I can build a house in a month less time since I use Bishopric Wall Board instead of plaster. In 3 hours I can finish the walls and ceiling of an entire room—and the room can be decorated that same day. No waiting for 'building weather' or for walls to dry. I can handle more jobs, for I'm independent of the slow-going plastering gang.

"Bishopric is the easiest thing in the world to apply. Even my youngest apprentice helpers can do a fine job. Anyone who can drive a nail can apply Bishopric Wall Board perfectly.

"It is sound-proof, water-proof, fire-resisting, and keeps out heat and cold. It reduces fuel bills in winter. Makes rooms cool in summer.

The Big Saving

"Another mighty important fact is that Bishopric Wall Board costs only half as much as plastering.

"It lasts as long as the house stands. Never cracks—never comes loose, never warps! Always stays solid and rigid! Ready for paint, paper, burlap, kalsomine, or any other decoration as soon as applied. That makes a big hit with my customers, for they're always in a hurry to MOVE IN.

Helps Get More Business

"I use Bishopric exclusively for everything I build—houses, bungalows, business buildings, hotels, summer cottages, garages, for adding rooms or covering old cracked plastered walls or ceilings anywhere."

How "Bishopric" Board Is Made

The turned back sheet (see cut) shows patented construction of Bishopric Wall Board. Made of specially toughened Asphalt (called Asphalt Mastic.) In this Asphalt are embedded kiln-dried dressed laths closely placed together, as for a plastered wall—and forced into the hot Asphalt under pressure of 500 pounds to the square inch. These laths are what make Bishopric Wall Board rigid and substantial. Sold under $5,000 Anti-Warp Bond.

The Wall Board comes in sheets four feet square. Sheets are nailed direct to studding—a nail being driven through each lath end. This holds the Wall Board absolutely immovable, so it cannot swell, bulge, or pull away from the studding. The sheets meet evenly at the edges, and form a smooth hard surface, ready at once for paint, paper, burlap, frescoing, or any kind of wall decoration.

The outer surface of Bishopric Wall Board is heavy, sized fiber board.

See the Lath!

Free Sample and Special Offer

Book, sample of Wall Board, copy of $5,000 Anti-Warp Bond, working plans for a Model House and interesting Special Offer are yours for the asking. Enclose 6c to pay postage and mailing.

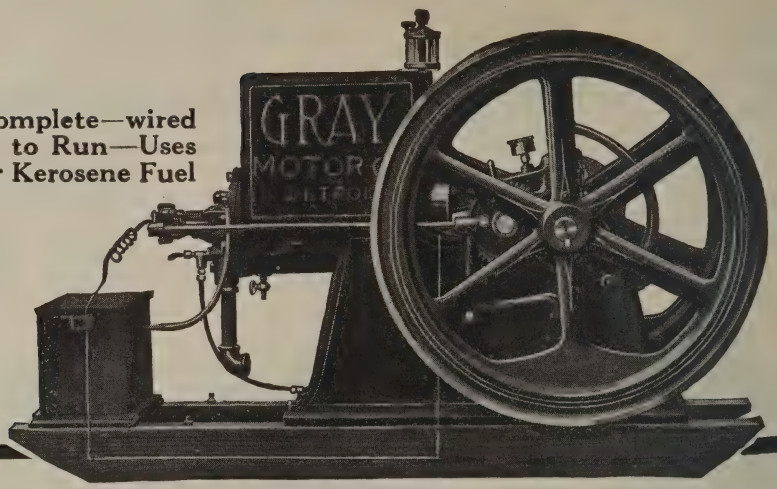
The Mastic Wall Board & Roofing Mfg. Co.

328 Este Avenue **Cincinnati, Ohio, U. S. A.**

BISHOPRIC WALL BOARD AND SHEATHING

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Shipped Complete—wired up—Ready to Run—Uses Gasoline or Kerosene Fuel



RELIABLE POWER FOR THE CONTRACTOR AND BUILDER

Here's the ideal gasoline engine for the contractor and builder. It could not be better adapted to the requirements of the average man in this business if it were made especially to order for his particular needs.

Will run the band saw, emery wheel, cutoff saw, jig saw, combination wood-worker, hoisting rigs, cement mixers, etc.

Especially well adapted to running the various wood-working machines advertised in this publication.

Use it in the shop or out of doors—makes an ideal portable outfit to take around to the different jobs.

Runs in any kind of weather—requires very little attention—furnishes **big** power or little power as required, and uses fuel in proportion to the power used—the automatic governor works perfectly.

Bigger Profits on Every Job

The first cost of this high grade—guaranteed engine is only a small consideration—they make a paying investment.

The cost for fuel is very small—will run **all day** doing the work of from 2 to 4 men at a cost of from 20 to 40 cents, depending upon the work to be done and the power needed.

Hoisting Rigs

We can quote you a very attractive price on a complete 4 H. P. hoisting rig—if interested write for special information on this subject and prices.

We'll Help You Make the Right Selection

The engine shown above is a 4 H. P.—it delivers **big honest horse power too**—it's the engine that will answer the requirements of a big majority of contractors and builders.

In some cases a larger engine might be required or a smaller size might do the work you have to do.

We have other sizes to select from, 1½ H. P., 2½ H. P. (and by the way, the 2½ H. P. is another engine that we can recommend especially to carpenters and builders), 6 H. P., and 12 H. P.

If you are not sure about the exact amount of power required, get our specifications—tell us what work you want the engine to do—our service department will give you an honest recommendation of the proper power for your need.

There is no use in getting more power than you need—it's a waste of money. Then again you will be dissatisfied if you get an engine that won't do all the work you have for it to do.

Write and ask questions—get the benefit of our experience—it's to our interest to tell you and tell you **right.**

30 Days Trial

We are willing to ship you one of these engines to try out at your own work—give it hard jobs to do every day—test it out thoroughly—if it does not prove to be everything we claim for it, we take the engine back and pay the freight.

Write today for our big engine catalog and ask for information about this **special trial offer.**

GRAY MOTOR COMPANY, 677 U. S. Motors Building. Detroit, Mich.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

INCREASE YOUR PROFIT MARGIN

Because it deeply cuts your woodworking costs, enlarges your facilities, and completes your operating equipment, you ought NOW to own an

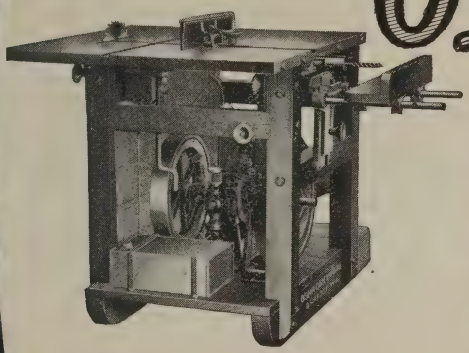
TRADE OSHKOSH MARK

EVEREADY
PORTABLE SAW RIG

This money-saving, work-speeding, Eveready comes to you on FREE TRIAL fully equipped for a

Great Range of Work

Cross cuts from square to any bevel, either way. Rips quicker than 6 men could. Does Jointing, Mitering, Rabbeting. Cuts Dados smoothly and like a flash. Has a Jig Saw auxiliary that is a wonder. Cuts Mortises, does Boring, makes Heavy Framing easy. Has a fine Sander, a Tool Sharpener, Saw Gauge, etc. ALL INCLUDED IN THE PRICE! No "extras" to buy when you get an Eveready.



You will be as satisfied with the Eveready as these practical men were after they saw it on their own work:

The Ferber Construction Company, of Hackensack, N. J., say:—"The Eveready saw rig has given us perfect satisfaction, and in fact, has far exceeded our expectations in every way. We would not now be without such a machine."

The H. O. Seiffert Lumber Company, of Davenport, Iowa, say:—"The first machine we bought from you gave good satisfaction and has saved us a good deal of trouble in hauling stuff back and forth to and from the planing mill. We have sent that machine to our yard in East Davenport and bought a new one, which is all you claimed for it. We are well pleased in every respect. We would not be without one for twice the money."

No Doubt About The Eveready

It will make good every claim printed here, and more besides. You can't know that until you test the machine for yourself, therefore you should

Try It Out At Our Risk Now!

You can find out first just how profitable it will be to own it; and you need not risk a dollar of your money until you do find that out.

Try It A Full Week Free!

Send for an Eveready today. Agree to give it a busy week's work and to keep tab on what it does and how little it costs you to do it. If it makes good, buy it. If it doesn't save you at least $10.00 that week, send it back!

Others Say It Earns $25 a Week!

Any contractor, builder, and retail lumberman will make the Eveready pay for itself in half a season's use. For it equips him with his own private planing mill, so fully equipped is an Eveready. And to the economy and convenience of that, it easily does the work of six men when used as a Saw Rig alone.

Straight Talk Sells It

Neither "bluff" nor strenuous tactics are needed to sell the Eveready. It does MORE, saves MORE, serves BETTER, than we say it does, and to prove this to the skeptical is the purpose of our offer to have you test it without risk to your pocket.

No red tape clogs this Free Trial proposal of ours. Simply tell us to ship you the machine complete, for a week's tryout,—no obligation will be yours beyond that of observing exactly what an Eveready will do on YOUR work, managed in YOUR way. Make your tryout NOW. Write to

Oshkosh Manufacturing Company

414 South Main Street, OSHKOSH, WIS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The "ABC" of BEAVER BOARD Construction

The eighth of a series of twelve monthly talks to carpenters about the practical use of *Beaver Board*, the *pure-wood-fibre* wall and ceiling material that is durable, economical, artistic; has none of the disadvantages of lath, plaster and wall-paper; and is appropriate to any type of building new or old.*

Beaver Board is essentially a proposition for Carpenters and Builders.

CHAPTER VIII

BEAVER BOARD for Window Trims

THE carpenter or builder who fails to introduce the merchant of his town to the possibilities of Beaver Board for Window Trims is overlooking a fertile source of business.

Merchants are constantly changing their window settings and consequently are on the lookout for some material that is economical, yet attractive.

Beaver Board is instantly recognized by them as the ideal material. It is not only economical and attractive, but it is wonderfully adaptable as well. Its pebbled surface lends itself to a large number of beautiful finishes and its light weight and strength recommend it for all manner of backgrounds, panels, set-pieces, etc., for window trim work.

Somebody is going to get this business. Why don't you get it and hold it with Beaver Board?

*This series began in the January issue. If you haven't seen the earlier chapters, write us and we'll send them to you.

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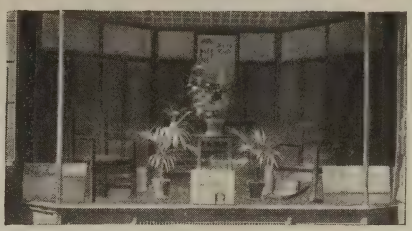
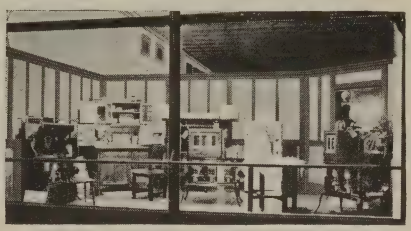
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

Beaver Board used as background in show-window of Leon's Store, Chicago, Ill.

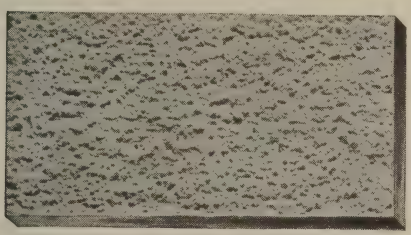


This display-window of Weed Brothers, Buffalo, shows how attractively Beaver Board lends itself to design and decoration.

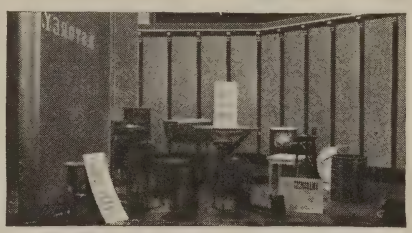
The Leader Store, at Parsons, Kansas, uses Beaver Board extensively in their show-windows.



Margeson Brothers, Portsmouth, N. H., show in this window a miniature Beaver Board room furnished with their furniture.



Above is a photograph of a portion of a BEAVER BOARD panel showing its pebbled surface which lends itself so admirably to an endless number of attractive finishes and designs.



The furniture display of D. Storey of Ottawa, Canada, is rendered doubly effective because of the realistic Beaver Board background.

BEAVER BOARD

PURE-WOOD-FIBRE

Walls & Ceilings

BEAVER BOARD

PURE WOOD FIBRE

The window of Foster, Ross & Co., Auburn, New York, presents an attractive example of Beaver Board used in set pieces.

GENUINE BEAVER BOARD has our registered trade-mark on the back of each panel and sample. It has also a light cream color all the way through that comes only by the use of sanitary, durable, PURE WOOD FIBRE. Insist on seeing both trade-mark and color before buying.

The BEAVER COMPANIES

Address all Correspondence

United States: 450 Beaver Road, Buffalo, N. Y. Canada: 390 Wall St., Beaverdale, Ottawa, Can.
Great Britain: 4 Southampton Row, London, W. C.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT. BUILDER

DULLKOTE PAINT Makes Wall-board Washable

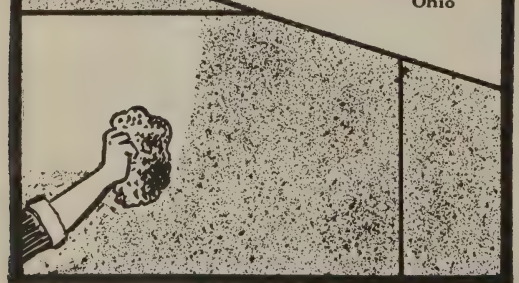
A "DULLKOTED" surface can be washed like tile. DULL KOTE is applied to the wall-board with a brush, in the ordinary manner, and can be readily cleaned with a sponge and water.

It dries hard—leaves no brush marks or laps—wears like iron—and is *very* economical. For use wherever wall-board is used, in residences, schools, stores and public buildings.

The wide variety of shades allows of handsome decorative treatments. Write for our free color chart, and several excellent suggestions for interior decoration.

The R. F. Johnston Paint Co.

Pearl & Main Sts.
Cincinnati, Ohio



How this Contractor Got the Job at Highest Price

There's a money-making suggestion here for you.

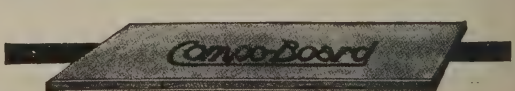
"I commenced a job this morning which I got although I was the highest bidder. My bid was accepted on account of being able to complete the work fifteen days sooner than the other contractor, because I am using Compo-Board * * * Here is what happened on another job. Compo-Board delivered yesterday at 3 p. m.—put up at 11 a. m. today, papered at 2 p. m.—and the room will be occupied tonight. I have used Compo-Board on cold, damp walls and it has given entire satisfaction." —John B. Walls, Philadelphia, Pa.

You can afford to specify or recommend only a wall board that will give the greatest satisfaction. You're safe in recommending Compo-Board. It's not only impervious to heat, cold, moisture, vermin, not only fire-resisting and non-warping, strong and durable, but it has several exclusive features. Can be papered, painted or kalsomined just as satisfactorily as a plastered wall, with or without panels.

Send your name on a postal card for free booklet and sample. Learn why the government and others who know prefer Compo-Board. It may be the most profitable postal card you ever wrote.

Northwestern Compo-Board Co.

5776 Lyndale Ave. No., Minneapolis, Minn.



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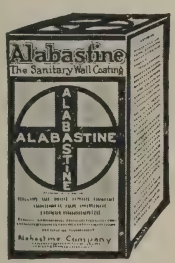
Owners of *Business Buildings* Find Highest Grade Materials Are *Cheapest* for all *Interior Decorating*

No higher grade wall coatings are produced in this country than Alabastine Company products. Since 1909 the demand for these goods has increased 40 per cent. Owners and decorators of business and public buildings, as well as homes have found that our superior wall coatings not only increase selling and renting values, but are the cheapest materials to use for the reason that they keep in good condition longer than kalsomine and ordinary paints, as they positively do not chip, peel or rub off when properly applied.

Alabastine

The Beautiful Wall Tint



In dry powder, ready to mix with cold water, applied with a regular 7 or 8-inch wall brush; packed in full 5-lb, packages, in white, tints and colors—also in bulk for large jobs.

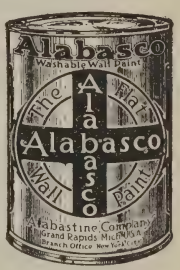
Alabastine may be easily washed, if desired, from any surface it has been applied to.

Alabastine, after being mixed, will remain in working condition for days, does not harden nor set in the bucket.

Alabasco

The Flat Wall Paint

Alabasco is the highest grade, interior flat wall paint produced. It is washable and absolutely dependable. For homes we recommend the use of Alabasco in connection with Alabastine. At a little extra cost Alabasco can be used in places exposed to finger marks—along the stairs, nursery, lower part of bathroom and dining room, also kitchen and cupboards. These exposed places can then be washed with soap and water. It comes in the same velvet-like water color tints as Alabastine. Is exquisitely soft and artistic on the walls and, properly applied, does not chip, peel or rub off. In bulk for large jobs.



Alabasco is now widely used for

Hotel, Club, Office and Home Decoration

Alabastine Company

736 N.B., Grandville Road
Grand Rapids, Mich.

Desk 36 N.B., 105 Water St.
New York City

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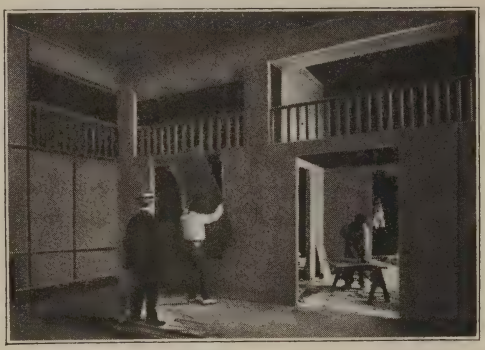

FIREPROOF WALL BOARD

Write for our Laboratory Test and let us prove it.
Send for a Sample and try to burn it.

WILL NOT WARP, EXPAND OR CONTRACT

It is a Mineral Composition made in sections.

THINGS UNHEARD OF IN WALL BOARD BEFORE

NO STRIPS ARE NECESSARY OVER THE JOINTS

Treat some rooms with **PANEL EFFECTS** if you wish, or where it is desired use **WALL PAPER** without wood strips over the joints. If you prefer you can apply **PAINT** directly on the surface.

ANY KIND OF DECORATION MAY BE USED

READY FOR DECORATION AS SOON AS IT IS NAILED IN PLACE

WRITE FOR INFORMATION ABOUT
Bestwall

BESTWALL MANUFACTURING COMPANY
1247 First National Bank Bldg.
CHICAGO

THE ONLY SATISFACTORY WALL BOARD

Rock Wall Board

for

Walls, Ceilings, Partitions

"Rock" stands for firmness and durability. In using ROCK WALL BOARD you are getting a material of **quality** and **durability.** It has a splendid surface for decorating, and can be finished in the most artistic manner. Possibly you have an attic or room you would like partitioned off—this is the best material for the purpose.

ROCK WALL BOARD is the modern material for remodeling or partitioning every room in any kind of building.

It is easily applied, sanitary and economical.

Rock Board is made in panels 32 and 48 inches wide by 6, 7, 8, 9 and 10 feet long.

Write us for further information, samples and "Rock Wall Board" booklet, beautifully illustrated

Rockford Paper Box Board Co.

Department R **Rockford, Illinois**

CONSTRUCTION

Building Construction and Superintendence. By Frank E. Kidder. Part 1—Mason's Work, Ninth Edition.—New and enlarged, thoroughly revised and rewritten by Thomas Nolan, M. S., A. M. Prof. Arch., University of Pennsylvania. New chapters on Fireproofing and Concrete, both reinforced and plain. Foundations, showing most approved work in recent structures etc. 965 pages. 628 illustrations. Cloth.....$6.00

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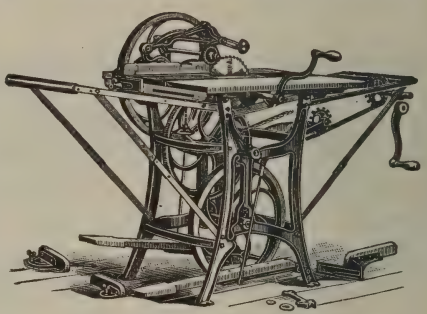

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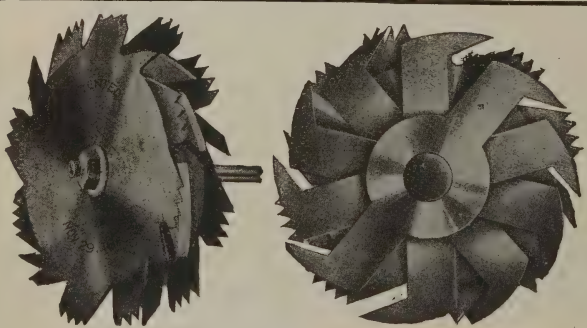

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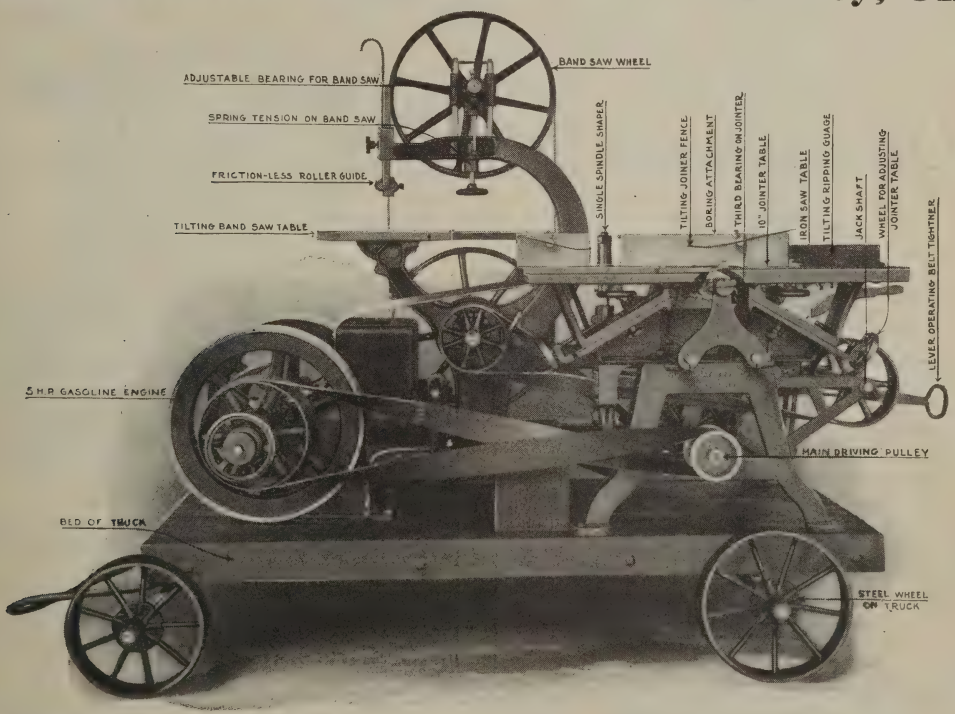

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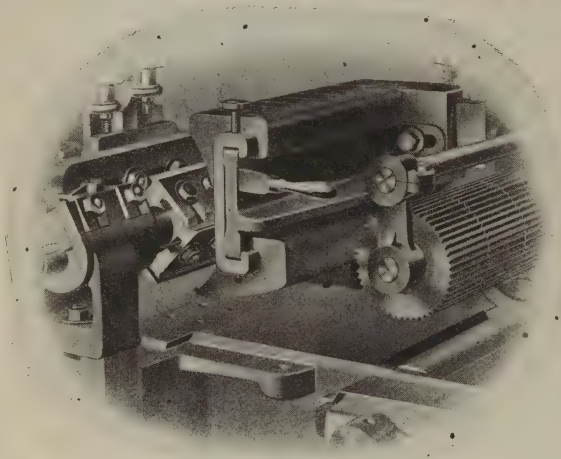

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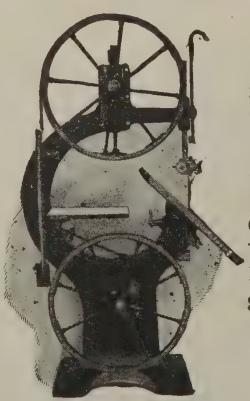

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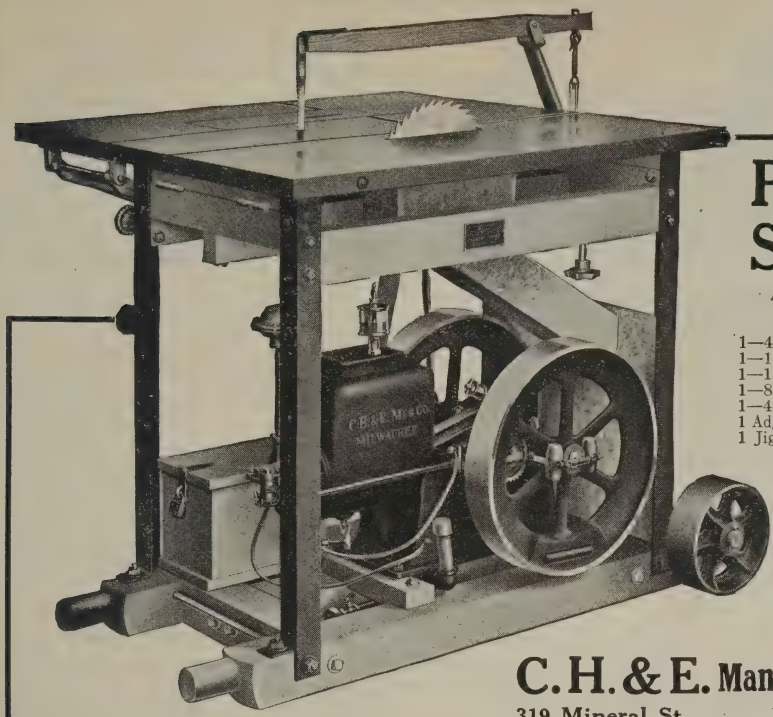

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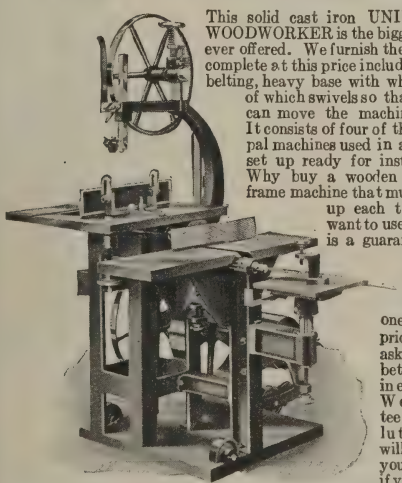

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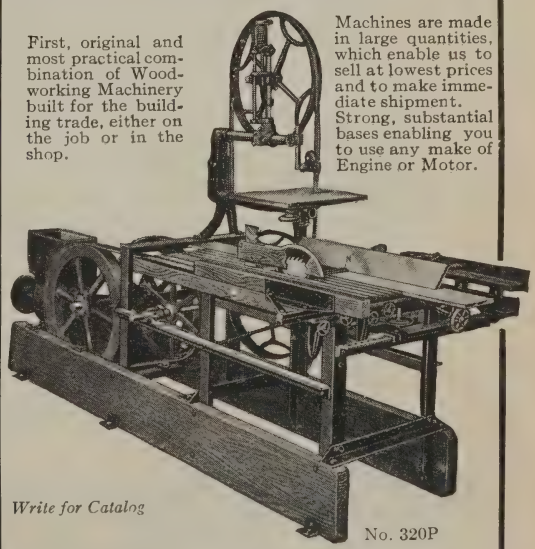

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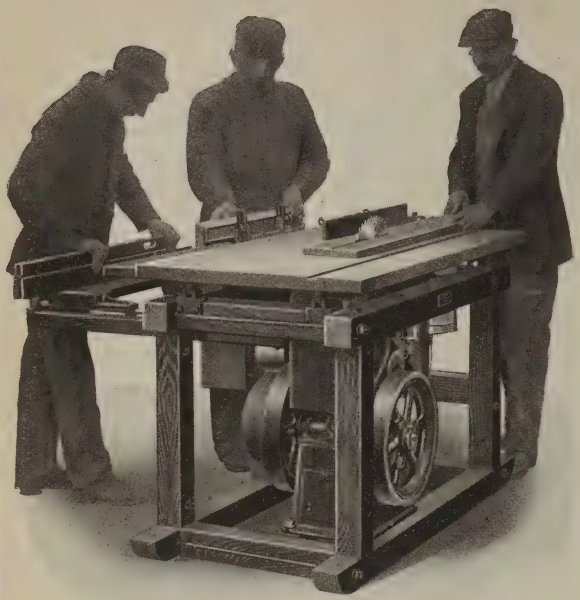

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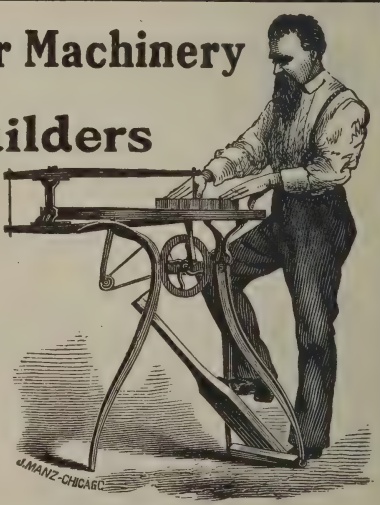

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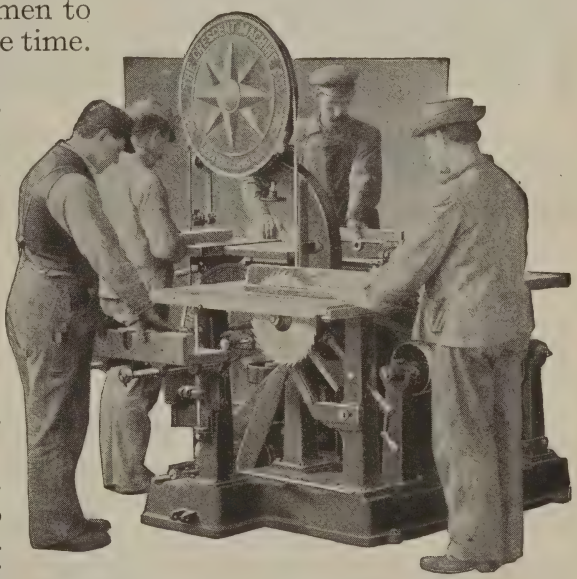

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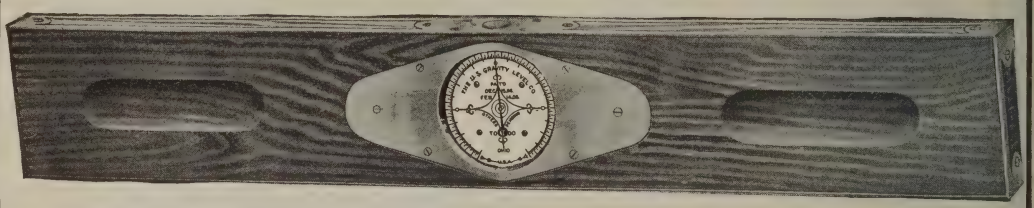

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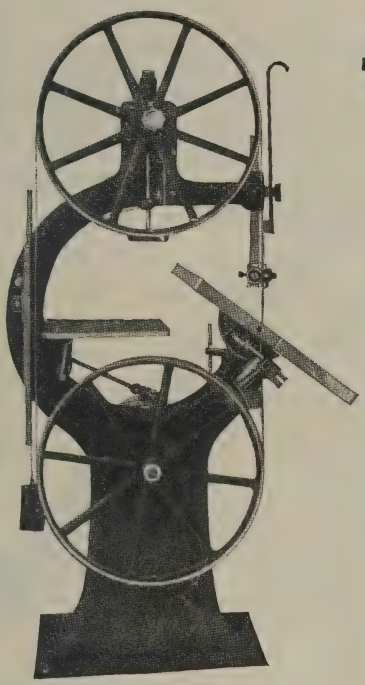

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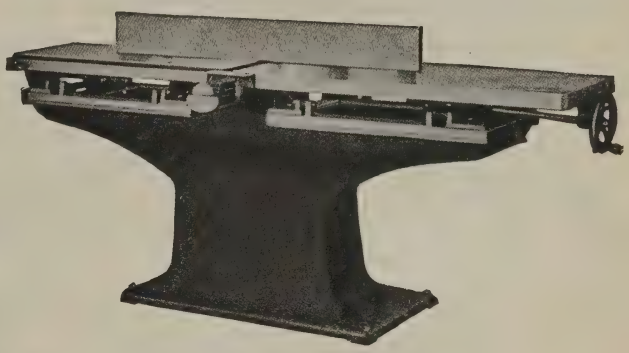

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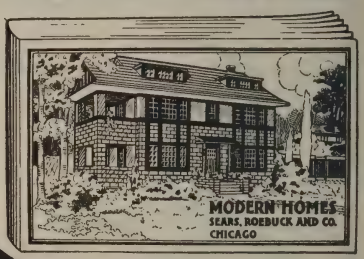

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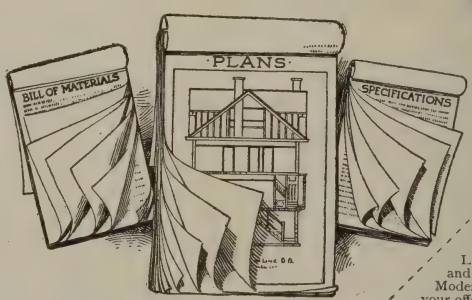

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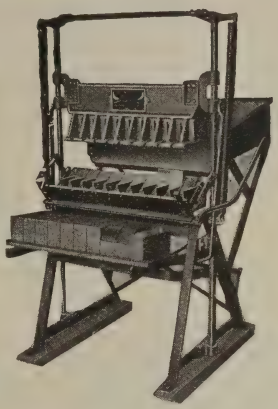

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Partial Table of Contents

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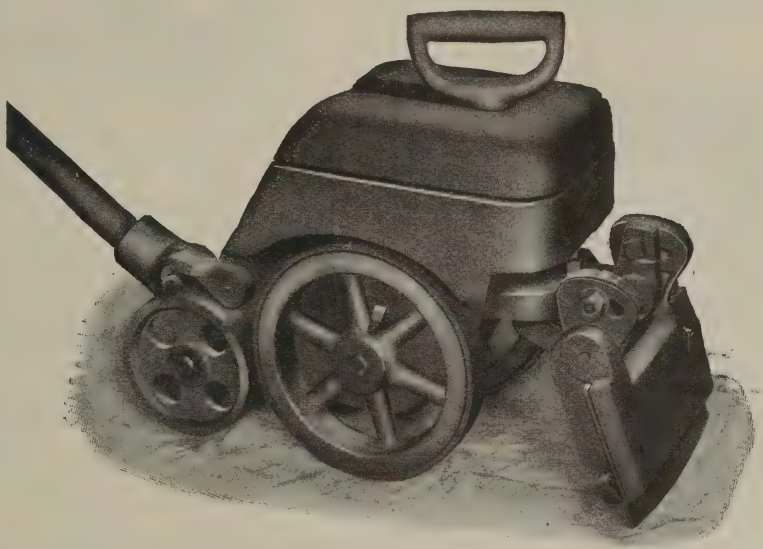

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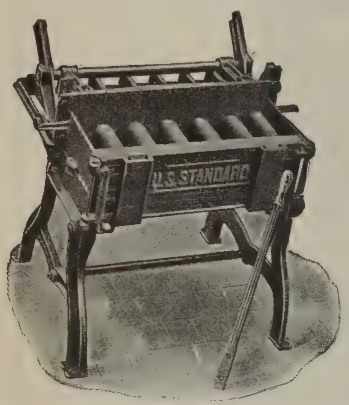

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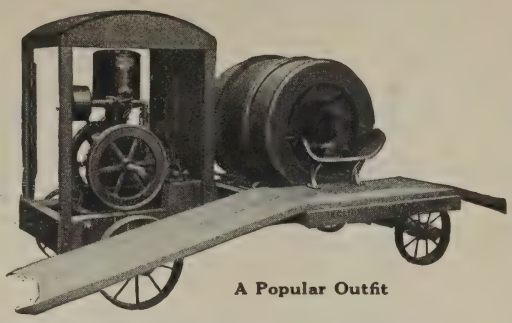
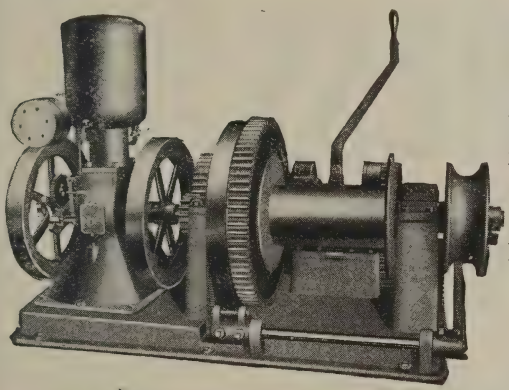
"The Standard" Low Charging Concrete Mixer

A Low Charging Batch Mixer with charging platform only about two feet high and portable with the outfit. The large opening at the charging end of the drum permits the entire batch to be seen while mixing. The discharge is semi-automatic and it can be operated from either end of the drum. Built in nine sizes, capacity two to forty cubic feet per batch. Furnished with any kind of power or without power. Especially suitable for smaller contract work, as well as for the large jobs.

New Catalogue No. 32 gives full information about regular and special designs which will save you money. Write for it today.



A Popular Outfit



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In addition to the hoisting outfits which we are prepared to furnish in connection with concrete mixers, we also offer "The Standard" Hoist with either gasoline or steam power specially designed for building construction, and contractor's use, for either single line hoist or double platform elevator.

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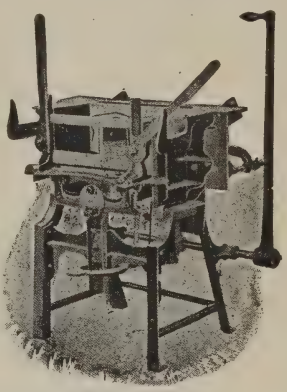

The Eclipse Concrete Stone or Block Machine

The Eclipse face-down concrete stone machine has many desirable features such as adjustability, simplicity, rapidity in operation, accuracy, high quality of stone, low first cost and operating cost. The Eclipse is adjustable in that one machine will make stone 4 inches to 12 inches wide and 4 inches to 18 inches long, and can be made up to 24 inches long by securing extra plates. The cost of extras for other machines, for making these various sizes of blocks, would alone be greater than the first cost of the Eclipse. Write for Stone Machine Catalogue.

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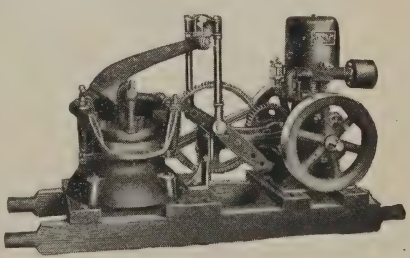
"The Standard" pumping outfits are mounted on skids or trucks and furnished in capicities of 3,000 to 6,000 gallons per hour.



If interested, also get our special catalogues on:— "The Standard" Pumping Outfit, including Gasoline and Power Pump; "The Standard" Two-Platform Material Elevator; "The Standard" Trucks; "The Standard" Scales.

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"The Wood Eternal" **CYPRESS** *"The Wood Eternal"*

Department of Agriculture, Forest Service, Bulletin 95, Page 44, issued June 30, 1911, says of Cypress.

"The properties which fit it for such wide use are the freedom of the wood from knots and other defects . . . and the *long period which the wood may be expected to last.* To this might be added handsome appearance, which frequently has much to do with popularizing a wood."

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Further on CYPRESS, the same Government Report says: **"The wood contains little resin and thus affords *a good surface for paint,* which it holds well. . . . It is a popular wood where it is subjected to dampness and heat. It shrinks, swells or warps but little . . . For the parts of houses exposed to the weather it serves equally well."**

Both quotations are from Bulletin 95 (page 44), U. S. Dept. Agriculture (Forest Service), June 30, 1911.

"The Money You Don't Have to Spend on Repairs is ALL PROFIT."

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SILOS
WITHOUT FORMS

They are quicker and easier to build, and you *save money* besides. Our free booklet (37) explains how by using

KNO-BURN EXPANDED METAL LATH

you can put up a concrete silo (practically monolithic and absolutely permanent) without the trouble and expense of forms. Farmers who have built their silos this way say the results are more than satisfactory. Our free booklet (37) gives full information. Send for one today.

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KNO-BURN EXPANDED METAL LATH

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Silos thus constructed last forever. Are easily and economically put up and absolutely without cost to maintain. The Kansas Agricultural Department is very enthusiastic over this form of construction; they have erected 23 to date, and contrary to an impression started and fostered by the competitors of concrete construction, they have shown an absolutely perfect preservation of the silage thus stored.

North Western Expanded Metal Company
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Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.

Avoid cutting away and weakening of timbers and walls—save labor, time and money.

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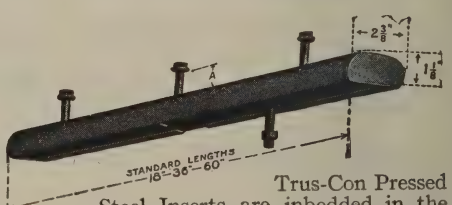
Shaft Hanger Supports for Concrete Buildings

Trus-Con Pressed Steel Inserts for Supporting Shaft Hangers in Concrete Buildings.



Trus-Con Pressed Steel Inserts are inbedded in the concrete during construction, saving expensive drilling after completion of the work. The long slots allow a wide variation in position. Special washers prevent bolts turning in the slots.

Write for details and prices.

TRUSSED CONCRETE STEEL CO.
384 Trussed Concrete Bldg. - DETROIT, MICH.

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The NATIONAL BUILDER

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split mast and boom for hand and power use. Equipped with all crucible steel fittings and gears, capacity 2 tons. For prices give length of boom, and if winch is desired.

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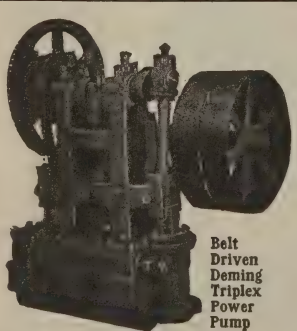

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May be belt driven or direct connected to electric motor, gas or gasoline engine. Made in all sizes for any service.

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THE NATIONAL BUILDER

Vol. 54 (48th Year) CHICAGO, AUGUST, 1912 No. 4

The Elyria Cottage, built at Elyria, O.

John Henry Newson, Architect, Cleveland, Ohio.

NATIONAL BUILDER DESIGN NO. 355.

For Floor Plans, Details, etc., see Supplement of this number. Estimated cost, architect's fees not included, $3,333.93.

Estimate of Elyria Cottage*

By I. P. HICKS

EXCAVATING AND MASONRY.

125 yds. excavating, 35c	$ 47.25
50 sq. yds. cement cellar bot., 60c	30.00
26,000 brick laid in wall, $13	338.00
Stone steps	15.00
Chimney caps	3.50
16 lineal ft. chimney breast, $2.50	40.00
20 lineal ft above, $2	40.00
36 lineal ft. double flue chimney, $2.	72.00
Total excavating and masonry	$585.75

*Materials are figured at Omaha prices. Carpenter labor figured at 40 cents an hour.

LUMBER BILL.

	Feet.
3 2x10x10 ft. Y. P. girder	50
4 2x10x14 ft. Y. P. girder	91
2 4x8x10 ft. Y. P. girder	54
18 2x8x16 ft. wall plates	378
8 2x8x18 ft. first floor joists	192
4 2x8x16 first floor joists	44
10 2x8x24 first floor joists	320
8 2x8x20 ft. first floor joists	216
5 2x8x14 ft. first floor joists	95
22 2x8x24 ft. second floor joists	704
14 2x8x20 ft. second floor joists	378
16 2x4x16 ft. ceiling joists	176
30 2x4x14 ft. ceiling joists	270
8 2x4x20 ft. rafters	136
12 2x4x18 ft. rafters	144
10 2x4x14 ft. rafters	90
10 2x4x16 ft. rafters	110
26 2x4x12 ft. rafters	208
10 2x4x16 ft. dormers	176
50 2x4x16 ft. plates	550
80 2x4x18 ft. partitions	960
6 2x6x18 ft. partitions	108
16 1x4x12 ft. bridging	64
30 1x6x12 ft. braces	180
Total ft. framing lumber	5,694
5,690 ft. framing lumber, $26	$147.94
1,660 ft. 2¼ face clear, Y. P. fl., $40	66.40
118 ft. 1x4x8 ft. fir flg., porch, $45	5.31
70 ft. 1x4x12 ft. fir flg., porch, $45	3.15
70 ft. ⅝x4x12 ft. fir ceiling, $30	2.10
118 ft. ⅝x4x8 ft. fir ceiling, $30	3.54
750 ft. ⅞x4 in. ceiling, cornice, $35	26.25
180 lineal ft. 1x6 fir finish, $45	8.10
180 lineal ft. 1⅛x8 in. fir finish, $50	9.00
12 2x8x16 ft. fir finish, $50	8.40
120 lin. ft. 1x10x16 ft. fir. finish, $45	4.50
200 lin. ft. 1x6x16 ft. fir finish, $45	4.50
2,100 ft. No. 2 sheathing, $26	54.60
2,300 ft. 10-in. lap siding, $30	69.00
5 rolls R. R. paper, 50c	2.50
1,700 ft. 1x6x2 roof sheathing, $26	44.20
17,000 clear R. C. shingles, $4.00	68.00
Total lumber bill	$527.49

MILL WORK.

240 ft. 1¾x2¼ cove, 2c	$ 4.80
160 ft. 1x2 band mold, 1½c	2.40
120 ft. 1x2 watertable, 1½c	1.80
2 large turned porch cols., $9	18.00
1 square column	4.00
1 pilaster column	5.00
1 flower box with brackets	6.00
2 cellar window frames, 28x12, div., 2 lt., $1.75	3.50
2 cellar window frames, 28x12, div., 3 lts., $1.75	3.50
2 cellar sash, 28x12, div., 2 lt., $1.50	3.00
2 cellar sash, 28x12, div., 3 lt., $1.50	3.00
1 twin sash frame, 16x34, div	4.50
1 triple sash frame, 18x34, div	6.50
1 transom, 74x12, div	2.00
1 triple, frame center, 30x24x26, side sash, 12x51	6.75
2 mullion frame, 4 wds., 16x34, div.	16.00
2 twin windows, 16x34, div	9.00
1 window, 22x34, div	2.25
2 twin frame, 12x34, div	8.00
2 lower frames, 24x30	6.00
1 twin frame, 18x24, div	4.50
1 triple frame, center 36x28, div., side sash 12x57	6.75
1 twin frame with tramsom, 16x32, transom 40x12	5.50
1 frame, 34x26, div	2.25
1 frame, 26x34 sash	2.25
1 frame, 28x22 sash	2.25
1 French door frame, 3′0″x7′0″	3.00
2 sash, 16x34, div., $1.50	3.00
3 sash, 18x34, div., $1.60	4.80
1 transom, 74x12, div	2.50
1 window, 34x26x24, div	3.50
2 sash, 12x51, div., $1.50	3.00
12 windows, 16x34, div., $1.50	18.00
1 window, 22x34, div	1.75
4 windows, 12x34, div., $1.25	5.00
2 windows, 18x34, div., $1.60	3.20
1 window, 36x28, div	3.60
2 sash, 12x57, div., $1.50	3.00
2 windows, 16x32, div., $1.40	2.80
1 transom, 40x12, div	2.00
1 window, 34x26, div	2.25
1 sash, 26x24	2.00
1 window, 28x22, div	2.25
1 French window, 3 ft. 0 in. x 7 ft. 0 in.	4.50
1 outside door frame, 3 ft. 2 in. x 7 ft. 0 in.	2.50
1 outside door frame, 2 ft. 8 in. x 7 ft. 0 in.	2.40
1 outside door frame, 2 ft. 10 in. x 6 ft. 6 in.	2.30
1 set door jams, 3 ft. 2 in. x 7 ft. 0 in.	1.00
1 cased opening, 7 ft. 0 in. x 7 ft. 0 in.	1.20
1 set jambs, 2 ft. 6 in. x 7 ft. 0 in.	.80
4 set jambs, 2 ft. 8 in. x 7 ft. 0 in. 80c	3.20

1 cased opening, 5 ft. 4 in. x 6 ft. 8 in.	1.10
3 set jambs, 2 ft. 6 in. x 6 ft. 8 in., 75c	2.25
4 set jambs, 2 ft. 4 in. x 6 ft. 8 in., 75c	3.00
1 front door, 3 ft. 2 in. x 7 ft. 0 in., 1¾ in.	18.00
1 vestibule door, 3 ft. 2 in. x 7 ft. 0 in., 1¾ in.	18.00
1 rear outside door, 2 ft. 8 in. x 7 ft. 0 in., 1¾ in.	10.00
1 grade door, 2 ft. 10 in. x 6 ft. 6 in., 1¾ in.	8.00
1 door, 2 ft. 6 in. x 7 ft. 0 in., 1⅜ in.	4.50
3 doors, 2 ft. 8 in. x 7 ft. 0 in., 1⅜ in., $5	15.00
3 doors, 2 ft. 6 in. x 6 ft. 8 in., 1¾ in., $3	9.00
4 doors, 2 ft. 4 in. x 6 ft. 8 in., 1⅜ in., $3	12.00
70 plinth blocks, 6c	4.20
1,370 ft. casing, 12 and 16 ft. length, 2c	27.40
1,370 ft. back band, 1c	13.70
160 ft. window stool, 2c	3.20
160 ft. apron mold, 1c	1.60
532 ft. window stops, 14 ft., ½c	2.66
684 ft. door stops, 14 and 12 ft., 1c	6.84
450 ft. base, 3c	13.50
450 ft. base mold, 1c	4.50
450 ft. base shoe, 1c	4.50
250 ft. picture mold, 1½c	3.75
Stairs	65.00
Kitchen cupboard, A	20.00
Kitchen cupboard, B	23.00
Ingle nook seats	8.00
Ingle nook beam	4.00
Fruit cupboard in basement	4.00
Linen closet	11.00
Medicine cabinet	5.00
Cellar stairs	8.00
Total mill work	$557.75

CARPENTER LABOR.

5,690 ft. framing lumber, $10	$ 56.90
1,325 ft. ceiling and porch floors, $1.50	19.87
230 lineal ft. cornice, 20c	46.00
1,660 ft. flooring, $2.00	33.20
Smoothing	20.75
2,100 ft. sheathing, 80c	16.80
2,300 ft. siding, $1.00	23.00
1,700 ft. roof sheathing, 90c	15.30
17 M shingles, $2	34.00
Setting frames	14.00
50 per cent cost of mill work for finishing	278.87
Total carpenter labor	$558.69

RECAPITULATION.

Excavating and masonry	$ 585.75
Lumber bill	527.49
Mill work	557.75
Carpenter labor	558.69
Hardware and nails	65.00
Tin work	25.00
Plastering, 650 yds., 27c	175.50
Plumbing	280.00
Electric wiring	50.00
Painting	210.00
Heating, hot air	140.00
Incidentals, 5 per cent	158.75
Total estimate	$3,333.93

The approximate number of cubic feet contained within the walls of this house is 19,300, which will make the cost figure about 17 cents per cubic foot.

Furnishing Elyria Cottage

By EDNA F. HURLBURT.

THE house shown in this number is built along the lines of the old English or Scottish lodge and is doubly popular for its solid construction and homelike attractiveness. It will be seen from the exterior perspective that it is designed along simple lines and simplicity coupled with comfort and warmth of coloring are carried out in the furnishings.

The furniture is such as will not have to be replaced within a few years and whereas it might mean an expenditure of a few more dollars, still in the long run will total less. A salesman in one of the large eastern furniture houses told me this spring that it was surprising how many new home-makers bought unsubstantial pieces with no more idea to comfort than sitting on a rock by

the seashore. The reason for this is not a lack of means as one might suppose, but rather a lack of time to enjoy the creature comforts of life, for in this mad American rush we only think of "getting there" and do not take time to sit down in our homes and "think it over." He told me this while I was looking admiringly at a copy of an old fashioned wing rocker, a regular Sleepy Hollow. Can't you picture the tired man of the house relaxing in one of these, after the day's duties, by this inviting inglenook?

On the following prices of furniture as large an amount as 20 per cent can be saved if purchased at special times in the year, at mid-winter or mid-summer sales when the buyers are making room for the following season's new goods. This applies also to rugs and ready made draperies. In selecting any piece at such sales care should be taken in regard to color, size and form, so that it could be used to real advantage. Buying a cumbersome piece of furniture to put in a small room would be spending money with bad returns and one of ugly lines and non-harmonizing colors would be antagonistic.

It is taken for granted that there are hardwood floors throughout the house and shades in all the windows with no particular mention being made of bed or table linens, china, silver or ornaments.

THE VESTIBULE, LIVING ROOM AND INGLENOOK.

As the lower floor is quite open there is a broad chance for a pleasing color scheme. With the ceilings of the vestibule and living room, also the inglenook, painted a flat tone cream, and the walls covered with a blended brown crepe paper, the idea of richness would be presented. About 18 rolls of paper would do this, as there is paneling in the inglenook. At 50 cents a roll, this would cost $9.00.

As a vestibule needs a rug that is practical and easily cared for, I would recommend a small high grade Brussels, known as the Chliema Brussels in soft tones to blend with the living room rugs. For this allow $5.00. For the largest rug in the living room choose a Wilton in tones of brown with soft red and suggestion of green. The 9x12-feet size would be best as that proportion would give a pleasing floor margin. The floors being well laid are in themselves attractive, so what nature has made in the beautiful woods should not be entirely covered, although I would suggest a small rug of harmonizing colors between this room and the dining-room and another at the foot of the stairway. For these allow from $65 to $75, as a beautiful 9x12-foot Wilton can be bought for $40 and that would allow from $25 to $35 for the two smaller ones.

It is now possible for those people unable to buy expensive Persian rugs costing several hundred dollars each, but who wish to procure the same artistic effect at a reasonable expense, to get all that is best in the Oriental weaving in an American production.

All draperies and overhangings can be made at home, thereby saving a great deal of expense. Such things can be made at leisure if the prospective home-maker will plan out her color scheme in time so that she does not have to rush. I was recently in a new house, the owners of which knew for a couple of months what the papers and furniture were to be, still did not begin the work of window treatment until they had moved in.

One artist has rightly said that curtains are like good manners—they soften the sharp edges and add much to the charm of life. Some of the most charming stuffs and beautiful combinations are being shown. For the draperies in the living-room I would suggest ecru scrim at 25c or 37½c a yard, or marquisette, which is a little newer on the market, and for the overhangings old rose Aurora cloth, costing $1 a yard, but as it is 50 inches wide, it can be cut to advantage.

With the foregoing description of paper, rugs and draperies, the room done in quartered oak, and the furniture of fumed oak, the idea would be carried out delightfully. Black mission has been very popular, but in certain localities the early English seems to be in demand and the fumed oak is a leader in New York and Ohio.

The prices quoted on most of the furniture practically guarantee sufficiently good quality for life long service. The same style in cheaper woods can be bought for less, but with furniture the cheaper grades are by no means the lasting ones.

The following in leather upholstered fumed oak would amply furnish this room—library table, $16; book case, $20; desk, $16.50; and desk chair, $4.50; divan, $21; winged rocker, $18, and two or three straight back chairs costing about $9 each. Have the reading

lamps in green pottery and copper.

When we speak of home life and what it means to the tired business man, we should feel that there was a great cure for his business worries when he ensconced himself in such a charming place as this inviting inglenook. Sitting before an open fire has such inexhaustible possibilities for the tired and worried one, for cares like the flames seem to disappear up the wide chimney. The ever popular window seats would be upholstered in leather to match that of the furniture, as we are treating the inglenook and living-room as one. As both the casement and French windows swing in they would be treated the same as the sash windows, excepting at the French window, I would hang only the old rose Aurora cloth, running it on rods at both top and bottom, which, when drawn would give more seclusion at night.

THE DINING-ROOM AND KITCHEN.

In so far as the living-room is conducive to man's comfort so should the dining-room be indicative of cheerfulness to the whole family for here it is that all members of the household assemble for their first general meeting of the day. Somehow a dining-room so furnished instills that qualification in ourselves.

With the ceiling painted a flat tone white, one attractive combination would be as follows—below the chair rail the walls papered in the same blended brown crepe paper as the living-room, relieved by a dull gold double stripe with small red motif between stripes, and above the chair rail with a beautiful gold and brown all over. With white scrim draperies and imperial blue Aurora cloth overhangings, and the rug a rich green, brown and blue 8 feet 3 inches x 10 feet 6 inches Body Brussels, costing about $26, the entire effect would be charming. Imperial blue Aurora cloth at the French window and the same color velours portieres at $3.50 a yard between this and the living-room would still further carry out the idea.

The furniture should be quartered oak as follows: round table with John Hancock base, $28. I speak of this particular base because it is so solid looking; buffet, $26.50; serving table, $12.50; large chair, $7, and three other chairs at $4.50 each. When the dining table is not in use, a large, Hampshire pottery vase with golden flowers would make an interesting center piece.

Now we come to the housekeeper's realm. A prominent educator once said to me "The kitchen is the index of the house," so with that in mind cleanliness is the watchword here. I think most housekeepers will like the size and compactness of this kitchen. As the general effect in any kitchen should be medium light in tone, have the ceiling painted a flat tone cream, the walls old gold and the woodwork silver grey. The surfaces can be scrubbed and one will find them not only sanitary but durable.

There must be a range which, of course, varies greatly in regard to style, make and amount of pipings. A good combination coal and gas range at warehouse prices can be bought from $40 to $60. In addition to the range this room will need a small work table, costing $2.50, and two chairs, 75c a piece. Plain white muslin sash curtains at 12½c a yard complete this sanitary workshop of the house and hang same at window and door in back entry.

The refrigerator being in its own allotted space saves a great deal of extra work. Much care should be given to the selection of this article both as to the arrangement of the ice box and to the food closet. There is a great difference in these in regard to the amount of ice consumed. I am using one, which, in comparison to many, keeps my ice bill lower by 30c or 40c a month.

This completes the lower floor and throughout these rooms, I have suggested the best grade of furnishings.

The walls of the stairway and upper hall would be pleasing in a two tone stripe brown oatmeal. This would require 10 rolls, at 40c, making $4. For the window at the landing, I would choose ecru net draperies at 50c a yard, and overhangings of Oban cloth in old rose and green at 65c a yard.

THE SECOND FLOOR.

The chambers should be done in a simple style which will never prove tiresome to their occupants. Paint the ceiling of the chambers and hallway cream, and at the window hang draperies of white muslin, allowing 25c.

The chamber over the dining-room would be very attractive papered in a yellow and cream stripe, each about a quarter of an inch wide and have cream paint and cream enameled furniture with brass bed. Allow for the bed, $25; spring, $5.25; mattress, $16; chiffonier, $16; dresser, $12; table, $3.50; couch,

$1, and chairs, $2 each. Colonial rag rugs for chambers have proved very satisfactory, small sizes costing from $1.25 to $3. Those for this room should be in brown yellow, and blue.

Some new ideas in chamber overhangings are being shown and linen crash with cretonne borders are proving very popular. Linen crash is 50 inches wide and costs 75c a yard, but only half the width would be needed for a side. If such material is chosen for this room, stitch on three inch bands of yellow and white cretonne, 6c a yard, about three inches from side and bottom and carry out the same plan for couch cover and cushions.

Portieres, curtains, cushions, etc., have been done in this manner for many beautiful homes along our North Shore.

An attractive paper for the alcove and bed room, treating them as one, would be a pale olive green. Have the woodwork stained tavern oak and Colonial rugs in grey, dull blue and olive green. Mission furniture in green weathered stain and wicker cushioned in green and white cretonne would give an air of coolness in the room. The windows, couch covers and cushions would be treated the same as in the other chamber, choosing the green and white cretonne.

I should put here a plain style white iron bed, $13.50; mattress and spring same as in other chamber; two couches, $15 each; mission chiffonier, $9; dresser, $12.50; desk, $9.50; two chairs at $4; wicker rocker, $7.50; wicker table, $8.

Tile the bath-room up about four feet, and enamel paint the remainder of the walls and ceiling. A green and white Saratoga rug would be a correct one for this bath. Hang white muslin curtains at windows to match those in chambers, thereby giving uniformity to the outside.

Itemizing the cost of these furnishings gives a total corresponding to the style of house and all imitations have been avoided.

A Woman Builder

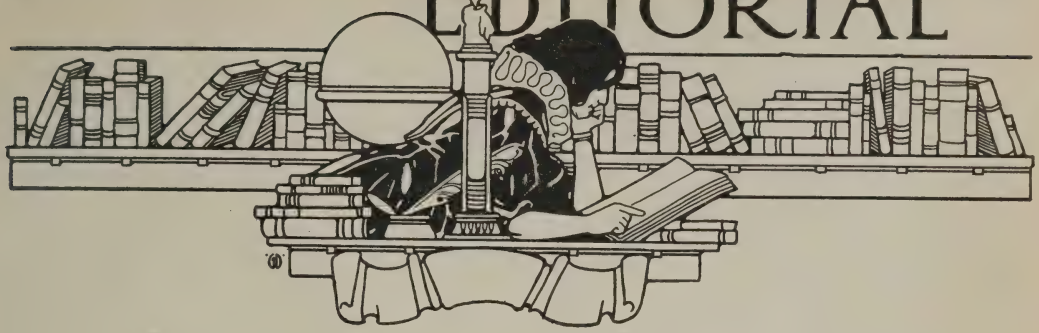
MRS. OLLIE McINTOSH, Cincinnati's first woman carpenter and house builder, is here seen measuring off timber

and sawing lumber for the new home she is constructing at Eighth avenue West, Price Hill.

Until six months ago when her health broke down, Mrs. McIntosh was a Price Hill dressmaker. Now she cuts boards and trims houses instead of cutting dress goods and trimming gowns. She says that the change of work has saved her life. For weeks passengers on the Elberon avenue car line have been craning their necks to see a short, plump little woman, clad in a neat gray suit, digging a trench and laying sewer pipe. Interest reached a climax sometime ago when the woman builder was to be observed on a high platform, mixing cement and pouring it into the wooden frames. Now, Mrs. McIntosh is working right along with the cerpenters. "I want to learn just how to do the work, so I can build the next house myself," she stated. "I broke down my health building dresses; now, I intend to restore it building houses. The open air is far healthier."

Mrs. McIntosh has planned to do all of the carpentry work on her next house, which she will construct adjoining the first. Already she handles a saw and drives her nails like an expert. "Why shouldn't a woman build her own house if she wants to?" is the query of Cincinnati's first woman carpenter.

EDITORIAL



Young man! if you are striving to become a builder, strive hard! To make a successful builder, it will be necessary to fill your head with big lumps of practical knowledge.

* * *

Men having a limited education—from a school room point of view—but well trained in matters practical, are likely to make good and proper as builders or contractors where fair fields are open to them.

* * *

College trained men, be they ever so bright, who have never had the benefit of a technical education or a training on actual works, are badly handicapped, and are almost sure to be left far in the wake in a struggle with a contractor, who from actual experience has a "run of the ropes," and who knows when and how to make taught the proper lines.

* * *

The man, however, who is fortunate enough to receive a good common-sense college education, and has had a good practical training also, should make a winner in every case. The two methods of training, when received by one person, are properly balanced and harmonized, and the personal elements are of the right sort, should produce a thoroughly equipped and competent contractor.

* * *

The personal element in the make-up of a contractor, counts for or against his success. Not only is it necessary that he be trained for the position he expects to occupy, he must possess force of character, courage and energy, must be a good judge of human nature, have a firm grasp of his temper, so that he can deal with his workmen in a calm, firm and gentle manner, when necessary. He must have foresight enough to be able to forstall losses whether caused by mismanagement, blunders, mistakes or mishaps. He must have a good general knowledge of business methods, be a fair accountant, and able to finance within certain limits. If cultured and well read, he will be able to mix with what is known as the "better class of society," which will materially aid him in pushing his way forward and upward. Honesty is a paramount necessity to the success of a builder. Once acquire a reputation for sharp practice or dishonest dealings, and most men will fight shy of you when giving out their contracts, and you will be eternally watched with suspicious eyes during the whole life of the contract, and the whole "pound of flesh," to a fraction, will be demanded as "so nominated in the bond." If you acquire a reputation for honest dealing and conscientious intentions, and win this reputation by your works, you will soon have such a grip on the people surrounding you, that your tenders for contracts will demand such consideration as will place you in a better position for obtaining the "job," than your less fortunate competitors, at better prices than might otherwise obtain. This is one of the rewards of honesty and uprightness.

* * *

The progressive builder will keep himself abreast of the times and with this end in view will subscribe for a number of journals pertaining to his business. He will also have a well stocked library of good practical works on the various branches of the building trades, including the latest works on

structural steel, cements, concretes, expansion of metals, reinforcements, strength of materials, mortars, stucco, paints, stones, marbles, bricks, glass and all other materials used in building construction and decoration. It is also essential that he have more than a fair knowledge of plumbing, gasfitting, electric wiring, and electric illumination, and we might say just here, that a most excellent work on this subject "Modern Illumination"—has recently appeared and should be on the desk of every progressive builder. The necessity of being familiar with much of the foregoing, must be evident to every intelligent contractor, as the knowledge will enable the latter to avoid many troublesome snags in the building laws, and of preventing plumbers or others of taking undue advantages in the working out of the contracts. A builder or contractor working from actual knowledge will be listened to with respect, and workers will not likely endeavor to avoid their honest responsibilities or "shyster" their work, when they know their superior will readily detect their shortcomings and call them to account for their derelictions. It will be the duty of the contractor to care for the trade catalogues in building supplies, furnishings, materials, etc., etc. Thousands of these are sent out by mail and otherwise, yearly, at considerable expense to the senders, and many of them are veritable treasures of sound practical information, and are deserving of preservation; besides it is not fair to men sending out their catalogues, to ignore them or to consign their literature to the flames or the waste basket. A place or drawer, left for them somewhere in the office, will often be found useful to preserve these live papers for future use.

* * *

A knowledge of woodworking machines, and of the work they can perform, while not absolutely necessary, will prove quite a help in estimating and arranging plans of attack on the woodwork. The contractor should be acquainted with all the various qualities of the woods he may be called upon to make use of, so that he may be able to so use and distribute them throughout his work as to receive the greatest advantage possible from their employment. The more he knows of the chemical qualities of the clays in the bricks he may use, the better, and the bricks themselves, of which he may build his walls should not be laid while there is blind ignorance prevailing, regarding their lasting and enduring qualities. The same may be said for the mortar used in the walls. In fact, the advice given regarding every item used in the construction of a building, is worth repeating and should not be lost sight of by the young man who is preparing himself to fill a position as a building contractor. The young man who is thoroughly equipped with all the necessary knowledge to fit him for a contractor, has obtained a liberal education, that will prove a greater value to himself and much more useful to the world at large than would a purely classic one. A classical education based on dead languages or literary lore, is not to be despised, for such is necessary to our happiness and well-doing, and fortunately, the world contains enough men of means, ability, and inclination, who are able to keep the flame of classic fire burning, and thus insure to the world, a continuation of the "light of other days."

* * *

The congratulary letters we have received, on the change in style and makeup of THE NATIONAL BUILDER, are too numerous and too lengthy to be quoted in these pages, as the whole paper—including advertisements—would not be able to contain them. Later, we may indulge in quoting a few of the good things that have been written of us by some of our readers and advertising patrons. Many of these made us blush when first read—and it is well known to be a difficult job to bring the "scarlet" to an editor's face. The following letter, however, which is one of a type of hundreds, and which is written in an earnest and well intended manner, and expresses the good feeling thousands of our subscribers have towards us, is more than gratifying to us, and while it may bring the color to our face, because of our innate modesty, it also calls up deep feelings of keen thankfulness, because of the knowledge it conveys of the appreciation of the efforts we have made during the past forty-five years.

We cannot conceive of a greater compliment being paid to an editor than that of being told his work has proved of benefit to his fellow men and has been, and is, appreciated and valued accordingly. This is more gratifying at this time, when the editor knows that his four-score years are pressing

on him heavily, and that the burdens of age warn him continually of the near at hand time, when he must hand his pen to younger and more energetic hands, that will doubtless guide this paper's destiny to a greater, and a more useful career than it has had in the past, though its publishers and all concerned with it have no reasons for complaint, or regrets for labors expended upon it.

We publish this letter, giving full name and address, and beg to say much more enthusiastic letters are before us, but this one more than covers the ground.

"Hamilton, Mont., June 6, 1912.

"Editor of National Builder,

"Chicago, Ill.

"Dear Sir:—It is with pleasure I give you my opinion of the change in the Builder. I thought before the change it was so far ahead of the other craft magazines, that it was in a class by itself, and hard to improve, but this is a great improvement, and I admire you more than ever. I have, I think, an entire set of your books, and along with the Builder they make a fine reference library that would be hard to improve on, for the every-day workman.

"By following your works and writings it certainly would tend to make any man want to be a better workman, a better citizen and in every sense of the word, inspire a young man of ambition, to do something better, and to follow in your foorsteps if possible. I have talked with a number of carpenters and they all agree that your books are the only ones for the common working man, as they are practically the only ones written in language he can understand. I believe you are fulfilling your mission in life fully as well, if possibly better, than any of Christ's Apostles, and will have a seat with, or above them! Long live you and your work! for I am sure it would be a difficult thing to fill your place and keep up the standard, and qualities of The Builder."

"Yours truly,

"O. C. Warnsley, 200 N. 5th St.,

"Hamilton, Mont."

Accurate Estimating

ESTIMATING building construction cost is largely a mathematical process, but successful estimating often depends upon whether the estimate is made up in a mechanical or in a conscientious way. It requires, in the first place, an analytical mind. In the second place, it demands resourcefulness, while in the third place it calls for a thorough knowledge of a dollar's buying power in the labor and material markets.

It has been said that the ability to estimate is the dividing line between the journeyman and the master builder. This may be true of small communities where residential and typical suburban construction is the rule; but in a great city like New York, the estimator is a very valuable and responsible part of a great machine, called organization, who is important to a great building organization just as the propeller shaft is vital to the propulsion of a steamship, says a writer in the Record and Guide.

Here in New York the estimator usually is a man who has studied building construction in an architect's or contractor's office. In most cases he is what is popularly known as a "climber." His salary ranges from $35 to $150 a week, but the average estimator receives a salary of $65. The estimating desk generally is looked upon as the final step in the builders' or architects' apprentice course, because he cannot hope ever to be a successful practitioner until he has mastered the art of making reliable estimates of material and labor to be furnished.

It requires more than mere accuracy and deftness in figuring. Experience and judgment are absolutely essential, a working knowledge of building construction, various materials, their market values and the discounts allowed in the trade is vital. Then he must know how to apply them to the peculiar conditions which surround the operation he is working on. But prices and discounts are constantly changing, the cost of labor is higher today than at any time in the history of construction and even construction methods are not proof against revision and reform. Building laws must conform to this progression, and what was lawful last year, may, by ordinance, be entirely unlawful this year. These are only a few of the many departments with which the estimator must keep abreast, because each change in practice

or improvement in material or methods, has a tremendous bearing upon the ultimate price of the operation and frequently, in this age of speculation, upon the final decision of the owner as to whether he will go ahead with his plans or postpone.

It therefore is apparent that the estimator must keep in constant touch with market conditions. To do this he must depend largely upon his own queries for figures and discounts, but the only way in which he can know that he is getting all the discount he is entitled to is by consulting his trade publication market reports, and by noting the trend of buying or selling in the wholesale market and the conditions governing the sources of supply and shipment.

Despite anti-trust and anti-monopolistic laws, the tendency of the times is to standardize building materials and when materials are standardized, prices naturally will be on a more or less fixed, or stable level. The price for many building materials today seldom, if ever, change, but the discounts on them fluctuate widely and sometimes suddenly. Glass and hardware are notable examples of this kind of price changing. Other materials, such as lumber, cement, common brick, sand, steel, gravel, crushed stone and cinders are subject to the primary law of supply and demand and their prices are liable to change without warning. There are other materials, such as front brick, stone, marble and roofing material which seldom report a fluctuation, and there are still other materials, like architectural terra cotta, upon which there is no fixed price, a special figure being given by the manufacturers according to the intricacy of the design.

Because of this wide variation in prices, some estimators figure their whole proposition out on a time basis, estimating materials in quantities and keep a cost data system in their offices upon which they can rely when information of this sort is sought at some future time. This is done whether the bids were successful or not. They afford an opportunity to compare the estimates of cost of the different items, with the actual cost of execution; and if a bid fails to win the job, satisfaction and experience may be gained by noting the items which may have been priced too high or too low.

Another source of information is the catalogue. If these are properly indexed, for ready reference, they will be found of great value for specific information. For close estimating, bottom prices and full discounts are necessary so that the estimator here consults the prices quoted by the salesmen direct, guided, the while, by the current market reports in his specialty publication carrying this kind of service.

It is a practice among small contractors to add a lump sum to the total costs, the size of which depends entirely upon the activity of competition and the circumstances of the operator. If the payments are to be arranged on advantageous installments, so that the bidder can take advantage of the time discounts allowed on all work, he makes his profit a little lower. If long payments (hence heavy interest charges), are specified, then his profit appropriation is apt to be big.

Some estimators base their profits upon a percentage of the estimated cost. This varies, in ordinary cases, from ten to twenty per cent, according to the caliber of workmanship stipulated and the selection of materials and the expense of handling it. Therefore, locality counts for much in the high or low cost of the work. The customer is still another factor. Ten per cent used to be the least that could be expected as a profit on construction work in suburban operations, but the quality of work usually required here in New York will increase the minimum level. When the contract is for sums not more than three or four thousand dollars it is customary to put the percentage a little higher than the ten per cent suburban figure previously stated. On all work requiring special skilled labor the cost percentage is about twenty per cent in New York and fifteen per cent in the suburbs.

This is an important item, especially if the work is of the suburban residential type, where one building may be duplicated many times. A considerable saving is then possible, because certain kinds of material are purchasable in large quantities, either worked or unworked. This is especially true in manufactured parts, such as doors, windows, columns, balustrades, trim and flooring. The distance of the work from the material distribution center has much to do with the profit, although when materials can be taken direct from car to job on a special order, the cost is materially reduced, because then the material has only one handling and the extent of damage or waste is greatly reduced.

Many contractors keep on file data of

haulage costs from different sites on which they have figured for reference, and in this way they sometimes are able to underbid their competitors on this item alone.

We have seen some of the conditions under which estimates are made. Heretofore we have been considering full and final estimates. But there is another kind of an estimate. It is known as the "approximate," and they are obtained with varying degrees of accuracy by several methods.

The most convenient and reliable of these systems is known as "cubing." It is a system of taking the cubical contents of a building and fixing a price upon it. The rate is obtained by a comparison of plans and requirements with similar buildings which have been erected under conditions as near like those of the job in hand as it is possible to find them.

There are several methods of making up a table of cubical costs. One method is to multiply the square feet in the plan of the building by the height from half the depth of the foundation to half the distance to the roof. Another system uses the height from the bottom of the foundation and another obtains the actual cubical contents.

Any of these may be used if the data for comparison is obtained in the same way, but all are subject to important variations which experience and judgment alone will determine. For instance, if the contour of the building is very uneven, with low portions, such as porches and sheds, and high portions, such as towers and cupolas, these must either be omitted from the whole and compared separately, or a lump sum be added or subtracted according to the size and elaboration of these members.

Another variation arises in the size of the rooms, giving a ratio of partitions and division walls which is not constant, and of course, a large building with many duplicate parts will require a different rating from a smaller one, so that the method of estimating by cubing is at best approximate, and its degree of accuracy depends largely upon the experience and judgment of the contractor. Even long experience will afford no safeguard against unusual features of the interior, so that the cube rates can only be applied to buildings of ordinary character, and comparisons are only reliable between buildings of like descriptions and uses, as the treatment of even the same materials will vary largely in buildings of varying uses.

The height of a building will not increase the cube rate proportionately, unless the internal voids are alike, although it is certain that the higher one builds from the ground the more time and expense it requires to put the material in place, to say nothing of thicker walls or heavier steel and more expensive equipment, especially in elevators.

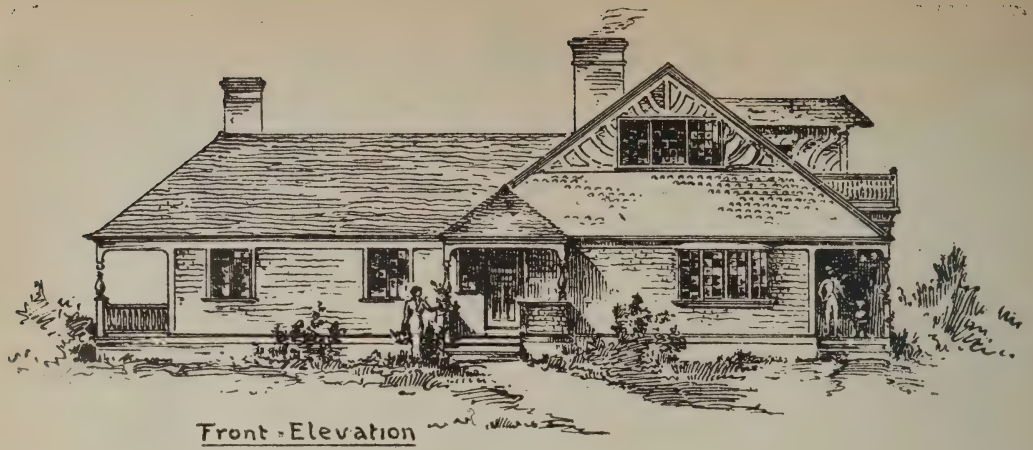
A convenient method of estimating is by the square of one hundred surface feet. This is especially applicable to office buildings, schools, mills, stables, garages and all buildings where the floors are few in number or similar in plan.

For one-story buildings the price per square is taken to include the roof walls, floor, and foundations, but for buildings of two or more stories, the price per square should be taken separately for each floor, the lower floors being prices to include the foundations and the top to include the roof.

This method of estimating by the square is not so accurate as by cubical contents, but the results are often more convenient and adaptable, because the tabulation of the square area of the various floors may be easily reduced to terms of accommodation for public buildings or shops. For instance, a given floor area in a school house means accommodation for a certain number of pupils; in a church for a certain number of sittings; in factories for the manufacture of staple goods, a certain number of machines and operatives.

This unit of accommodation is sometimes carried farther and, by the reverse process, is made the basis of another method of estimating the approximate cost of such buildings, i. e., schools, churches, factories, hospitals, mills, etc. This also is used as a method of comparison, the known data being supplied by previous experience or by calculation, and it is often valuable as a means of determining the approximate cost of buildings necessary to accommodate a certain number of individuals or machines, even before any definite plans have been drawn.

All of these methods are approximate, with varying degrees of accuracy. But before using this system as a basis for a contract figure, a sum, governed by the judgment of the estimator of the actual operation, should be added to the total of the original estimate to allow for any possible shortage.

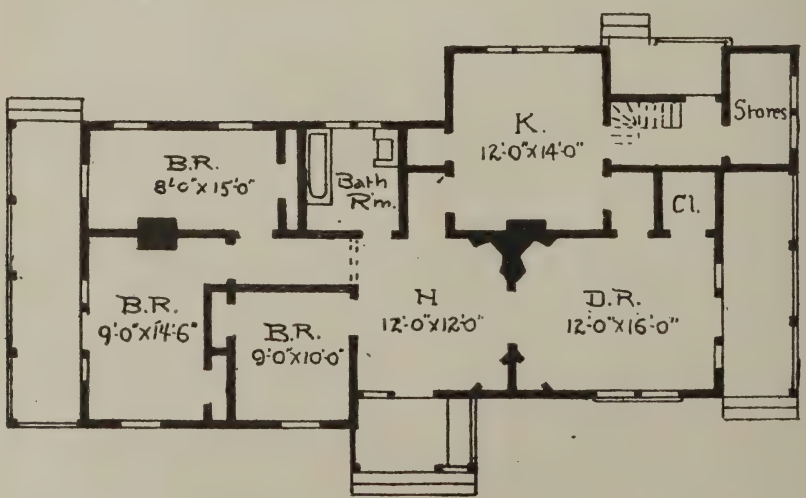


Front Elevation

Side Elevation.

BUNGALOW
with ATTIC.

ARNOLD W. BRUNNER
ARCH'T.
NEW YORK.



Plan

Sanitary Equipment of the Modern Building*

By CHARLES F. SMITH.

(Continued from July)

MATERIALS AND METHODS:

It is always advisable to place the house drain above the cellar floor, it is quicker and easier to install than when placed below the floor, consequently cheaper, and is always accessible for repairs. There may be cases however, where it would seem necessary or expedient, to run the drain below the floor. It should in either case be provided with accessible hand hole cleanouts at all connections to vertical pipes, and at all bends, and the trap, if below the floor, must be set in a brick pit of ample size, with a metal or stone cover.

Where the drain is run above the floor, it must be securely supported at each joint, if of cast iron, or every ten feet if of wrought iron, by brick piers from the floor, by hooks to the side wall, or by adjustable hangers from the floor beams above. The house drain, the house sewer and all horizontal pipes, including the leader connections must be evenly graded not less than one quarter inch per foot; one half inch per foot is better, as that increases the capacity of the pipe 50 per cent, due to the more rapid flow; for instance; a four-inch horizontal leader connection, if graded ¼-inch per foot would drain 3,000 square feet of roof surface with a moderately heavy rainfall; if graded ½ inch per foot, would drain 4,500 square feet. In localities having a heavy rainfall, it is safer to grade ½ inch per foot, or use a size larger pipe than with the ¼-inch grade, but never use a main leader less than 3 inches in diameter, or a house sewer or drain less than 4 inches in diameter. A safe rule to follow for size of leader, is to allow one square inch of pipe area for each 250 square feet of roof area. If it is found by this rule that a pipe larger than 4 inches in diameter will be required, it is a good plan to increase the diameter of the house drain and sewer one inch larger than the leader.

If the house is situated in a low lying district, where the sewer is likely to overflow during a heavy rainfall or, if the house sewer discharges into a river, a lake, the sea, or any body of water affected by tides or freshets, a flap valve should be installed near the end of the house sewer to prevent the sewage from backing up into the house. In such cases the house sewer should be graded one-half inch per foot, to secure a flow sufficiently rapid to carry paper and sludge past the valve, without clogging it.

A horizontal pipe too large for the work, or one without sufficient grade will allow the water to flow slowly away, and leave the sludge to gradually choke up the pipe; on the other hand, a pipe graded to steep will permit the water to flow more rapidly than the heavier sludge can, and it consequently collects in the bottom of the pipe, and impedes, if it does not entirely stop the flow. The better rule to follow is ¼ to ½ inch per foot. The proper sizes of pipe for the different fixtures, etc., will be given in a table later.

For flashing around the vent stack where it comes through the roof, lead pipe or seamless drawn copper tubing a little larger than the outside diameter of the stack hub should be used, soldered to a flange of the same material extending about ten inches beyond the pipe on all sides; this flange should be carefully soldered to a metal roof, or laid under the courses of a shingle, slate, tar or other similar roof. The section of vent stack to which the flashing is to be made, should extend about 15 to 18 inches above the roof, the hole through the roof made as large as the outside diameter of the pipe hub; the lead or copper tubing is then placed in position, and it must be long enough to rise about 2 inches above the vent stack: the flashing is secured to the roof by solder, or large headed tacks and the end of the tubing turned into the hub of the vent stack; a sec-

*These articles were begun in the July, 1912, number.

tion of cast iron soil pipe of proper length is then calked into the hub of the vent stack with oakum and molten lead, the same as the joints below the roof are made. This makes a good water tight job, and has a tendency to protect the vent stack from frost.

Where it can be avoided, plumbing pipes should not be run between the ceiling and floor above; it is next to impossible to get the proper grade, and if any stoppage occurs, or repairs become necessary from any cause, it makes a troublesome and expensive job, and is very likely to ruin the ceiling below. It is better to run the pipes vertically in, or at the side wall, or in a partition and connect to the house drain in the cellar; this applies of course, to where fixtures are placed on opposite sides of the building. For this reason it is a good plan, when designing the building to have the bath-rooms or toilets on the upper floors, directly over those on the floor below. It is far more economical and more satisfactory in every respect. In moderately large houses where lavatories are placed in inner rooms, or in large rooms away from the side walls, it becomes necessary to carry the waste pipe under the floor, but the horizontal run should be well and evenly graded away from the fixture and be as short as possible and securely held in place, and always bear in mind that every fixture in the house must be provided with a trap placed as close to the fixture as possible, and be properly vented. Where wash tubs and a sink, or basin adjoin each other, it is all right to have the tubs discharge through the sink trap, but the connection must be made to the trap below the water seal and to the inner, or house side of the trap.

The branch vent connection should be made to the waste pipe, with fixtures other than water closets, and with these it should be made to the soil pipe about 18 inches from the closet, and only to the upper side of the pipe. If connected at the side, it is liable to become clogged up, particularly with the soil pipe. It has been the general rule in the past to make the vent connection for water-closets as near the closets as possible, and for other fixtures, to the crown of the trap, or very near to it. This is bad practice in both cases. When placed at the crown of the trap, evaporation of the water seal is increased, and in that location or near it, the splash when the fixture is flushed, will carry grease, paper, lint and other light articles into the vent opening, completely choking it up in a short time, rendering it absolutely ineffective. It is a safe rule to make this connection about 6 or 8 inches from the trap for smaller fixtures, and about 12 to 18 inches for water closets. The branch vent must connect to the main vent stack above the fixture to insure that it shall never become a waste pipe in case the proper waste or soil pipe should become temporarily stopped up. The overflow pipes from all fixtures must be connected to the inner or house side of traps to insure protection against sewer gas.

A frequent source of trouble from escaping gas, and one very difficult to detect, is the connection from the water closets to the soil pipe. The earthenware water closets as now made, have the trap above the floor within their own construction, consequently any connection made below that point is open directly to the sewer, and great care should be exercised therefore to make a thoroughly and permanently gas tight joint. The plan most generally followed in making this connection, is with a cast brass floor flange, recessed into the floor to bring the top of the flange flush with the floor, the end of the four-inch lead pipe forming the "lead bend" is then brought through the brass flange, flanged over to fit into the recess of the brass flange and soldered to it; thus far it is all right, but now comes the defect; a heavy ring of putty is then placed on the lead flange, the closet set in place and bolted to the brass flange with from two to four brass bolts. The putty soon hardens, then vibration, or a jar, or the ordinary settling of the house breaks the putty joint, and the seal is gone. This method should not be followed, and is prohibited in some localities.

There are other and much better plans, and but very little more expensive and, as the ordinary house will have but one, or two water-closets, the slight additional expense of an improved closet connection really cuts no figure at all.

In fact, if the owner, building for his own occupancy a house costing say, from fifteen hundred dollars up, would stop a moment in his efforts to secure a cheap construction to consider that, he is building probably but once in a lifetime, he will occupy the house

during his own life, and raise a family, some of whom will likely live in it after him; suppose the sanitary equipment does cost seventy-five or one hundred dollars more than anticipated, if he secures an installation in accordance with the best modern practice, not necessarily elaborate, but with fixtures and fittings of good quality, that look well, work well, are durable and above all thoroughly sanitary, it is well worth the price, and he will never regret paying it, while a cheaper installation, because of serious defects, may shorten his own life, or that of some members of the family.

There are a number of excellent closet floor connections on the market. Where the "lead bend" is used, it is generally necessary to solder the upper end of it to a special brass floor flange, which in turn is bolted to the closet with other special flanges, and a rubber gasket or cement filling interposed to make a gas tight, but somewhat flexible joint. Where a cast or wrought iron pipe connection is made instead of the "lead bend," screw flanges are provided, but otherwise the joint is the same.

All connections from lead pipe to iron pipe must be made with a "wiped" joint to a heavy brass ferrule, which in turn is calked into the hub of the cast-iron pipe or screwed into the cast-iron fitting of the wrought iron pipe, whichever style is being used.

Traps:

The style of trap in most general use for the smaller fixture, is some form of the common "S" or syphon trap, although there are many improved and patented traps on the market, which are claimed to be proof against syphonic action, the most common trouble with all traps. The best is none too good in this case, and when we speak of the best, we do not always mean the most expensive, nor the most complicated. A trap should not be complicated and need not be expensive, but the sanitary trap is the strongest safeguard one can have against the admission of sewer gas, therefore care and consideration should be given its selection. An efficient trap must have a deep water seal, its interior must be devoid of anything that will act as an obstruction to the free and natural flow of the water, or serve as a collector of grease and other matter. The outlet must be so arranged that it will offer as little opportunity as possible for the collection of lint and other small particles likely to empty the trap by capillary attraction, and the cleanout screw should be submerged, or otherwise protected from escaping gases when removed for cleaning the trap. It is probable the ordinary form of "drum" or non-syphon trap fulfills these requirements as well as any. The common objection to the "drum" trap is that it is not self cleansing, and is therefore liable to collect grease and other matter, which soon becomes foul. There are a number of improved forms of the "drum" trap on the market, which are claimed to be self cleansing usually by centrifugal action of the inlet.

Bath tubs are usually connected with a "drum" trap, with the cleanout screw on the top, set flush with the floor. Unless there is an inner cylinder extending below the water seal, this screw will always be exposed to sewer gas, and when opened will allow the gas to enter the room, and when screwed back into place, the joint is very likely to be imperfectly made. In any case precautions must be taken with these trap screws to use only new and perfect washers and screw the plug is good and tight.

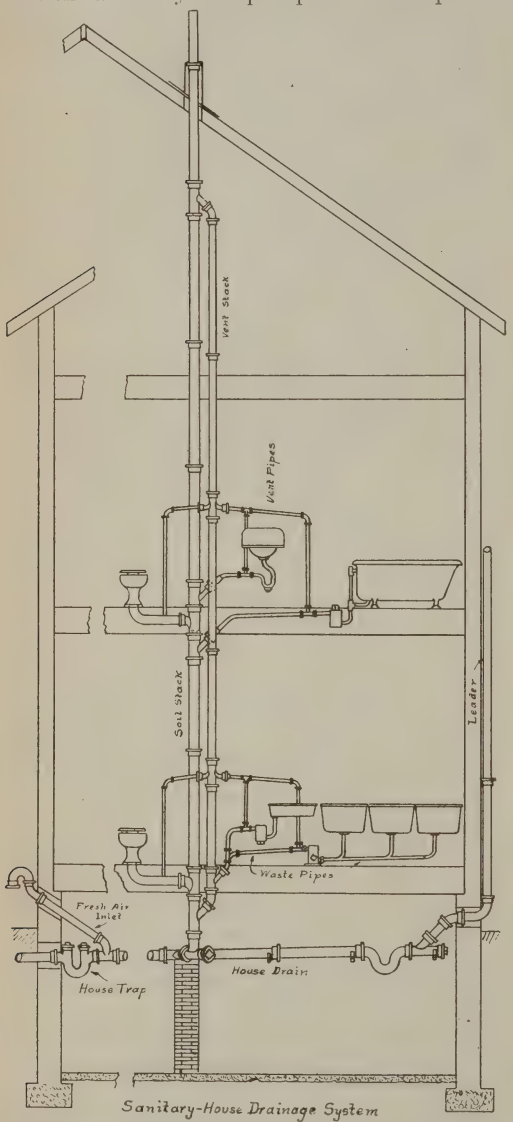
It is the safer plan to connect bath tubs, wash tubs and sinks to some form of "drum" trap, while the lavatories may be connected to an "S" trap.

Testing:

After all the "roughing in" has been completed, that is, all the pipes are in place, but no traps or fixtures set, except the house and leader traps, and no pipes covered or painted, the first test should be made. The better way to do this is by the water test, when the weather permits; it is simple and effective.

Plug up or close tightly in some way all the openings except the vent stack in the roof, then fill the entire system of piping with water through this vent opening. If there are any leaks, they can be readily seen on inspection of the piping. As the water exerts a pressure or head of nearly one-half pound per square inch of area for each foot of height, and as a 4-inch pipe has an area of about 12.5 square inches, this would mean with a vent stack of say thirty feet above the house trap, a pressure of about 15 pounds per square inch, or a total pressure of 12.5x 15 equaling 187.5 pounds against the plug in the trap; these plugs therefore need to

be very tight. Special plugs are made for this purpose to fit the different sizes of pipe. The ends of the lead pipes may be bent over and hammered together tight enough. If the weather is too cold to permit of the water test being made, all the openings may be closed except one small one, through which air may be pumped to 10 pounds



gage pressure, and strong soapsuds brushed over all the pipes and joints. A leak will quickly show itself by the soap bubbles, and by the drop in pressure on the gage. Of course, all leaks in joints must be permamently stopped, and defective sections of pipe removed.

After all the traps and fixtures have been set and the traps filled with water, the final test must be made. This is preferably done with smoke pumped into the vent stack on the roof to a pressure of about one-inch on a water gage, that is, a pressure which will raise a column of water in one leg of a glass "U" tube one inch high. This is sufficient pressure to force the smoke through any leaks, or past any defective traps, without forcing the trap seals. Special smoke pumps are made for this purpose, and every contractor should have one.

Where a test must be made, and no smoke pump is available, the peppermint test may be resorted to. It is not reliable, although it has been much used, sometimes improperly, in the past. For the ordinary house job, two ounces of oil of peppermint, or of cloves, not the essence, may be procured in a tightly corked bottle and taken by the person who is to use it, to the roof, together with a pail full of boiling hot water and a sponge, or piece of cotton waste tied up with a string a few feet long. When all is ready, all the windows of the house should be closed, the peppermint is poured onto the sponge, which is lowered into the vent stack, the hot water poured down, and the vent stack closed. The second person, inside the house, then makes a careful inspection and if there are any leaks or defective trap seals the peppermint odor will be detected. Care must be taken not to open the bottle of peppermint in, or about the house, for if the odor gets into the house except through the proper channel, it will be impossible to make the test.

The accompanying drawing on this page illustrates the correct method of installing the drainage system in a residence of two stories, attic and cellar. The same system can, of course, be extended to a greater number of floors.

It will be noticed that the vent stack is connected to the soil stack near its base, and again in the attic, and also that the waste pipe from fixtures on the first floor is connected into the vent stack, instead of the soil stack. This is because rust, or scale collects in the base of the vent stack to so great an extent, that if not washed out by the discharge from some fixture will eventually choke up the pipe.

A Country Residence

By H. MARING, Architect.

IN this publication I have sought to show a specimen of an inexpensive country residence composed partly of one of the new materials that are fast supplanting the wood of former days.

This residence is to be the home of L. H. Warncke of Wilton, Connecticut, and is estimated at $8,500, including all modern improvements.

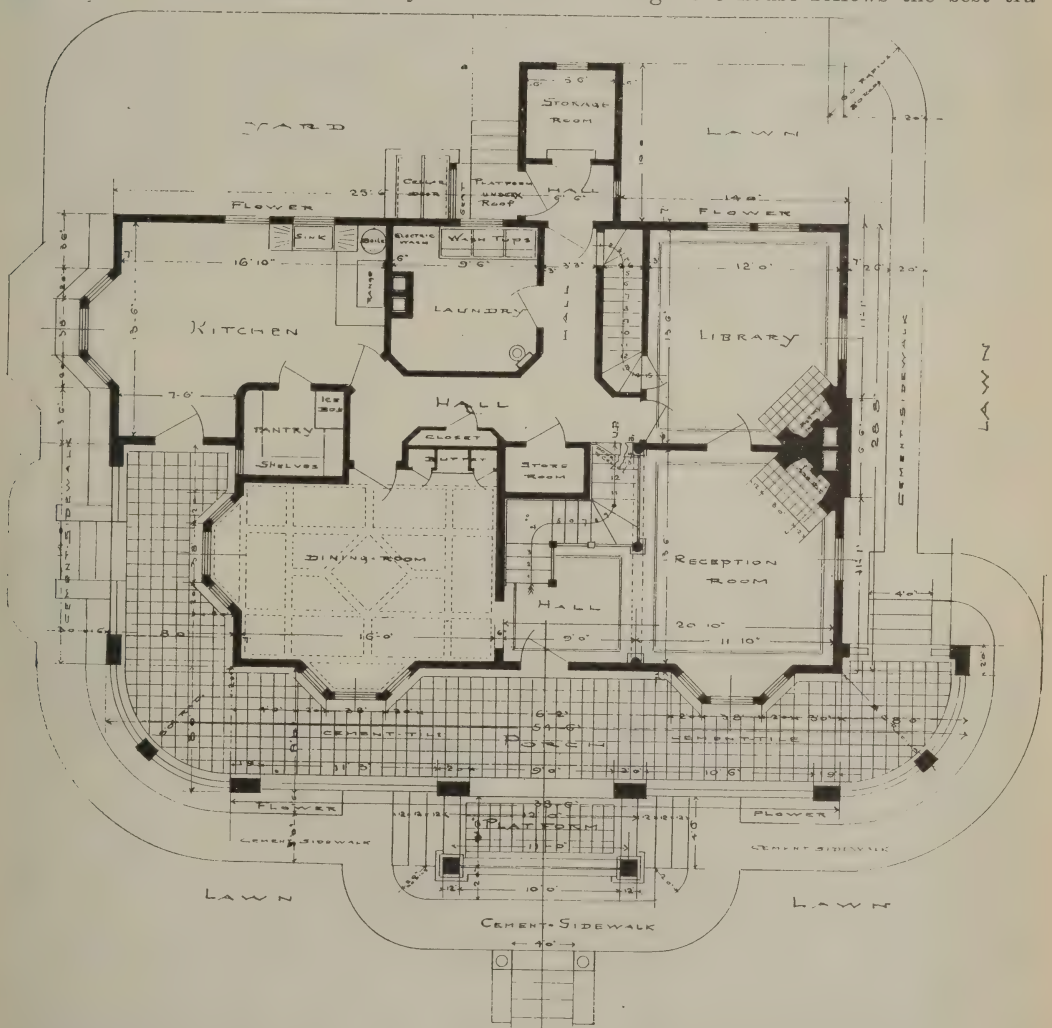
It is to be built near the top of a sloping hill, with a fine view across a valley and an opposite hill top, overlooking its local town and that of Cannon Station.

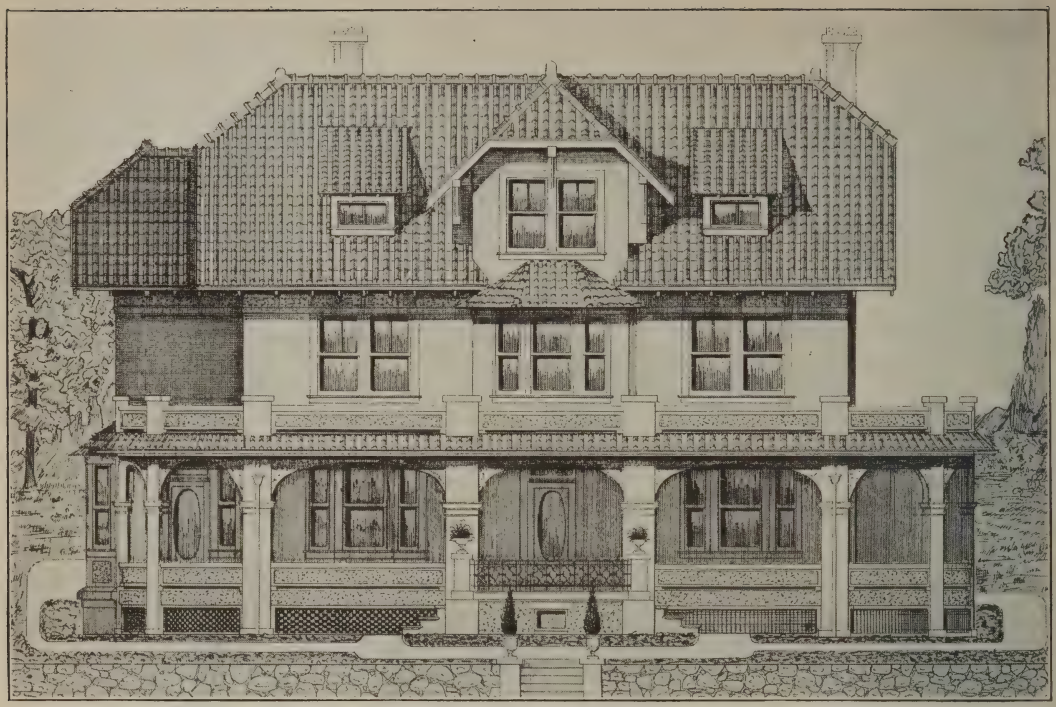
It is set on the upper corner of the plot having a gate entrance to the street. This gives an excellent opportunity for a remarkably effective garden front, and a stone terrace from which steps lead down to the driveway.

The garage is at the rear of the house about 200 feet away, and is also of stucco. This arrangement, it will be seen, uses every opportunity given by the somewhat rounded grounds, producing a stately and ample effect.

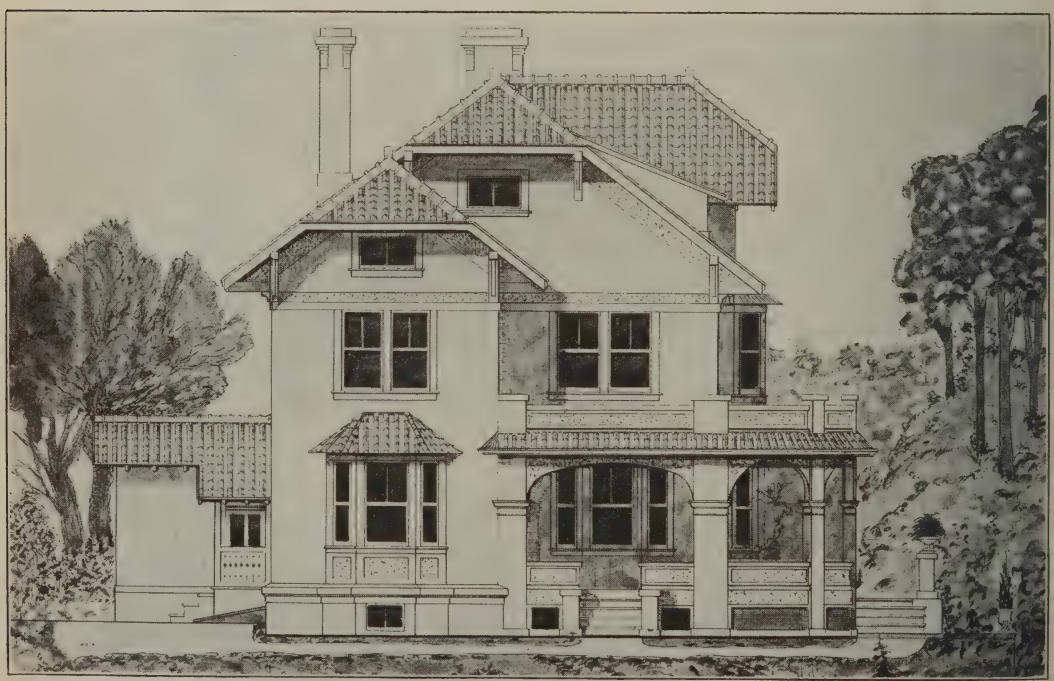
In design the house follows the best traditions of its material and is of country style, framework construction, and stucco, conveying the idea of a comfortable home.

The gently sloping roof is of red Span-





Front Elevation.



Side Elevation.

ish galvanized tile, which has precisely the same effect as the old clay tile and insures a durable and artistic roof. These tiles are made from a new process of galvanized steel, No. 27 gauge, and stamped to the shape of Pan tile, in plates or clusters of 10 tiles each, requiring 10 plates to cover a square. The lock on these tiles is so made as to be absolutely watertight and the whole produces a pleasing effect.

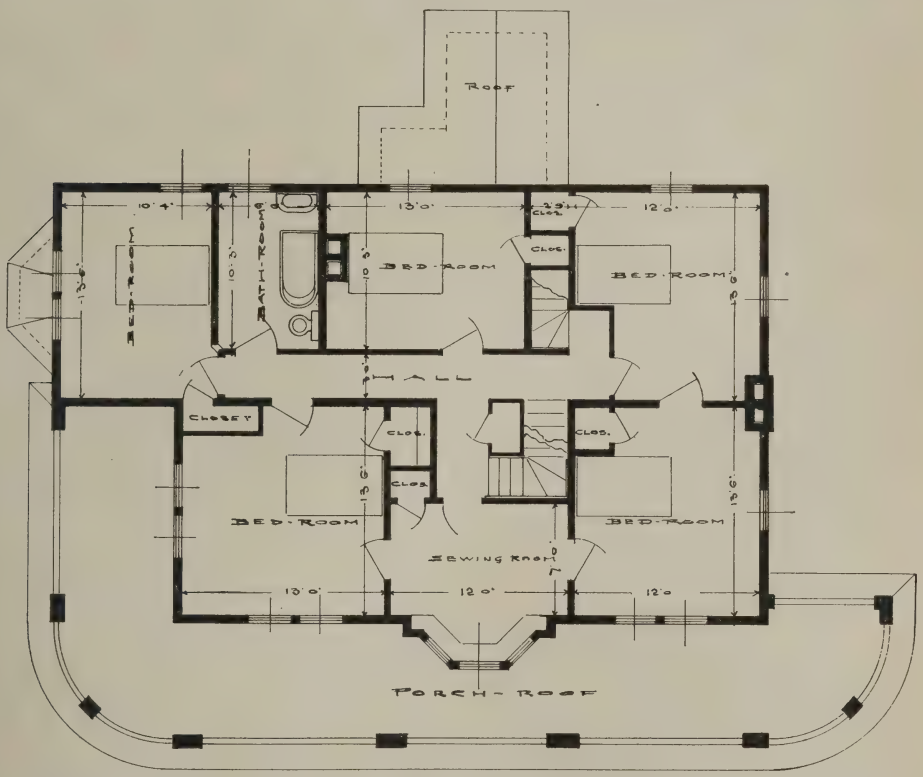
The use of plaster for the exterior is certainly a problem worthy of study, as it requires the application of the best simplicity in art.

by 12 inches will be laid, with very thin joints.

In the interior the rooms are pleasantly grouped and arranged to meet owner's desire.

The main floor has a reception hall from which a flight of stairs run to the second floor. These stairs are held by round columns, upon which a pretty design of grille work rests, and overhanging draperies render them especially attractive.

The dining room, library and reception hall wood work will be of Circassian walnut, consisting of a high wainscot and a wooden



The exterior of this residence is finished in cement stucco on hollow brick, between wooden studdings and stuccoed on the hollow brick with the rock asbestos stucco in a buff color. This causes a pretty effect and is unlike any other residence in this section of Connecticut.

All exterior porch columns, posts and outside steps, etc., will be of plain concrete. The chimney and fireplace of brick and the hearth will be of colored cement tile. The porch floor will be of reinforced concrete slabs on top of which cement tile 12 inches

beam ceiling. The wood work of the second floor is to be of chestnut.

The walls of the interior are to be of plaster work on metal lath and a ready patent plaster has been specified, which is much lighter in weight, is fireproof and reduces sound on account of the large quantity of a high grade of asbestos fibre it contains.

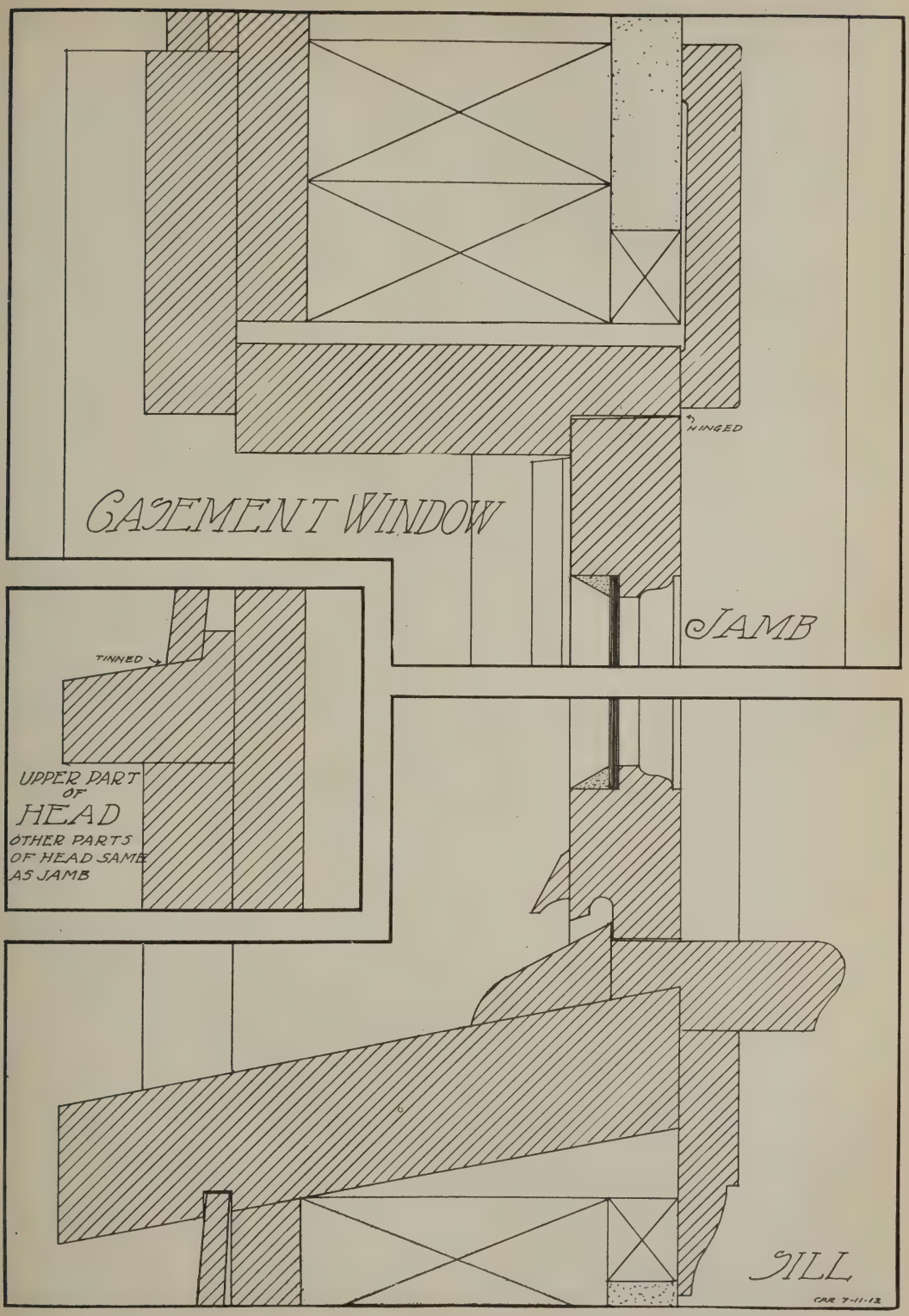
All foundations, walls and footings to grade lines will be of plain concrete, and the walls above them of concrete blocks. Portland cement will be used throughout the building.

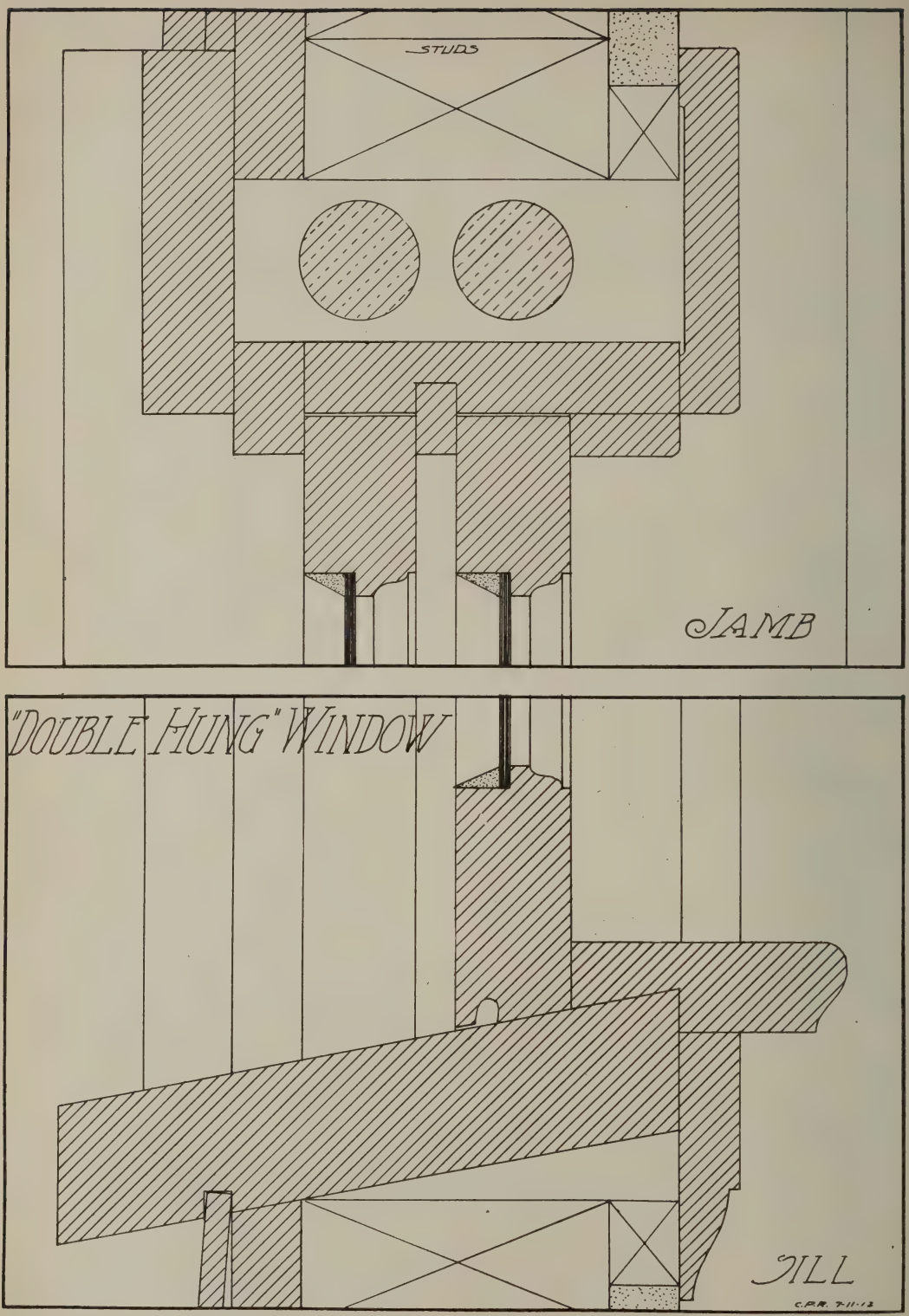
Window Details

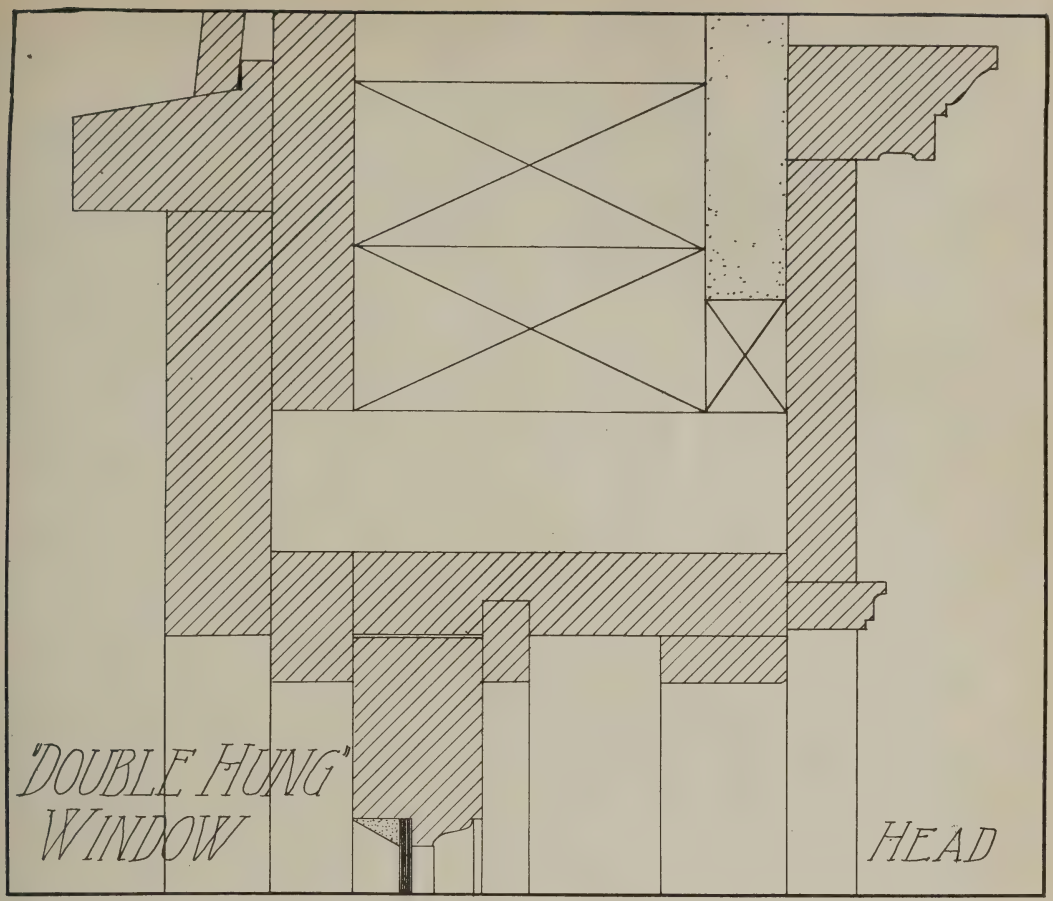
By CHARLES P. RAWSON, Architect..

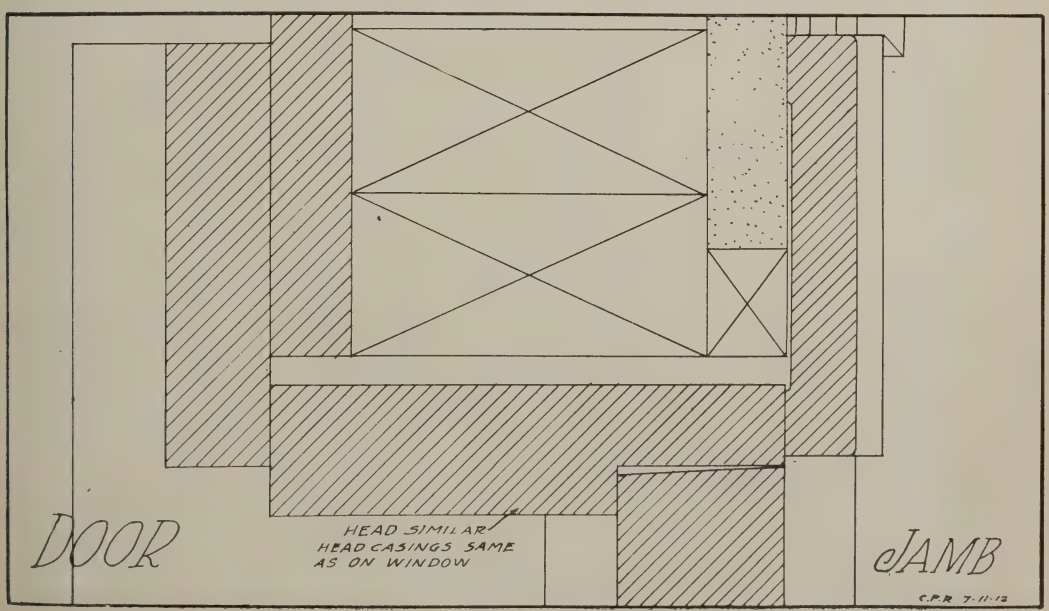
IN A letter received from a contractor in a town in the central west, is a request for large size working details for window frames, both the ordinary double hung and the casement type, and for door frames, for moderate cost frame houses, covered with shingles or siding. We are, therefore, giving this month such details drawn to the scale of six inches equals one foot or one-half full size. Such details, it is hoped, will be of value to many beside the man who requested them, as frame houses still form the big majority of all houses built in this country. The kind of frame shown for double hung windows is what is known as a skeleton frame and is made without a ground casing, without which a true pulley style cannot be insured. Another weakness of this kind of frame is the use of a single sill instead of a sill and sub-sill. Grounds nailed to studs to serve as a gauge for plastering and as a nailing for the trim are shown, but are sometimes omitted in cheap grades of work. The tops of all windows on exterior are almost always exposed to the weather and, as indicated, should be well flashed with tin, galvanized iron or copper. The casing should always be wide enough to allow a nailing into the studs. The outside casing should never be less than one and one-eighth inches thick to receive siding or shingles. The openings around sills and heads should always be well filled with oakum or plaster. The inside stop bead should never be made less than one and three-fourths inches wide so as to allow proper space for the fixtures of window shades. At the lower parts of all pulley styles, a pocket should be made to allow access to the sash weights. The casement windows illustrated are made to swing in as this was the kind requested by our correspondent, although the author believed that the kind swinging out has many advantages. The sash shown, however, if constructed with care should not leak and, of course, allows the use of a stationary screen on the outside which many prefer to the hinged screen on the inside which becomes necessary when the sash swings out. The frame is made similarly to a cellar window frame and is one and three-eighths inches thick and is rebated for the sash. Sash for casements are sometimes made a little heavier than shown. The casings, etc., should be made to match the double hung windows. The bottom sill of all windows should be grooved as shown and the casement sash should have as an additional precaution against rain, a moulded water nose secured to it. Frames of this kind might be used if the building were covered with stucco, if a large mould were run around the outside of the casing.

Perhaps in this connection, it might not be out of place, to answer several questions which have been asked by young carpenters regarding the proper size to cut window openings in frame houses. How high should the space be between the headers and how wide between the studding for double hung windows which are provided with weights? Windows are always listed and sizes given by glass measure, as 30 in. by 32 in., 2 lt. This means that the window has two lights, 30 in. wide and 32 in. high. In figuring the height of the opening allow 11 in. in addition to the two lights of glass, or 75 in. between the headers. This figure is made up as follows: upper sash, 2 in., meeting rail 1 in.; lower sash, 3 in., sill 2 in., head, 1 in., and play 2 in. In figuring the width of the opening, add 10 in. to the width of the glass, or 40 in. between the studs. This figure is made up as follows: each sash, 2 in.; each pulley, style 1 in., and space for each set of sash weights 2 in. In very large frames it is well to allow 1 in. more for each dimension. In the cutting of openings of casement frames, use the same rules as for doors, that is add 3 in. to the width of the door or casement sash and 4 in. to the height or casement sash and 4 in. to the heighth to get the size of the opening. If these rules are carefully followed there should never be any trouble in setting frames.


HINGED
CASEMENT WINDOW
JAMB
TINNED
UPPER PART OF HEAD
OTHER PARTS OF HEAD SAME AS JAMB
SILL
CAR 7-11-12


STUDS
JAMB
"DOUBLE HUNG" WINDOW
SILL
C.P.R. 7-11-12


"DOUBLE HUNG"
WINDOW
HEAD


DOOR
HEAD SIMILAR
HEAD CASINGS SAME
AS ON WINDOW
JAMB
C.P.R. 7-11-12

Making the Letter Head More Effective

By IRWIN SPEAR.

LAST month the subject of letter heads was treated in a general way and from the analytical and critical standpoints. Now let us consider various kinds of letter heads and their advantages and disadvantages. Let us go into details and see what are good points and what are undesirable features of letter heads.

Broadly speaking, from the side of mechanical execution, letter heads may be lithographed, plain type printed or embossed.

What are the pros and cons of each? Let us see. To begin with, lithographed letter heads are desirable where the quantity used is large. It is not economical to lithograph a small number of letter heads because the "first cost" of doing such work is expensive. In the long run, however, or if a large number of letter heads are required, the lithographing process is a decided saving and even were it not, the results would justify the somewhat higher cost.

The following extract from the brochure of a lithographing house, while written purely in the spirit of salesmanship, contains some arguments that are resirable and worthy of consideration. The brochure says in part:

"Lithographed letter heads will raise you in the estimation of everyone who reads your letters. And, all things considered, they will do it without costing you any more. The difference between lithographed letter heads and printed is apparent at a glance. Lithographed letter heads 'Stand out.' They are always clean cut. The tone is always soft, rich and pleasing, giving an effect of quality out of all proportion to the cost.

"By this process, the impressions, which are made direct from a stone specially designed for your use, retain their crisp outline uniformly. You may have a run of 1,000 or 100,000 and the last sheet will not be distinguishable from the first.

"How about ordinary printed letter heads in such a case? Equal uniformity is simply out of the question. The 'life' of an electro is at most not over 20,000 impressions. Every impression wears the plate a trifle. Consequently the latter impressions have a washed out appearance. Is this economy? Think of the effect on the reader of your correspondence. Is such stationery calculated to inspire confidence? Does it make the recipient feel that he is dealing with a first-class house?

There is another side to this subject also. A lithograph stone is good for a lifetime and more. In printing from plates or type, new plates must be made from time to time. Another unavoidable disadvantage of printing from type which lithography eliminates is the cutting through of the plate so that the impression shows on the reverse side. Again, in using lithographed letter heads you can cut loose from all limitations of type style and arrangement. You secure individuality of display not possible in printing.

"The business dress of your letters is as important as your own appearance. More so, perhaps, for more persons see your letters than see you. If your stationery does not reflect the prosperity and standing of your house, are you not wasting a big opportunity and maybe a lot of business in the bargain?"

If you want to use lithographed letter heads, the house that does the work will generally make up a design on speculation for your approval. This is done by artists who specialize on such work. No charge is made for these designs.

The average contractor, indeed, probably ninety-nine out of every hundred, uses a plain printed letter head. Plain type-printed letter heads have the advantage of being easily, quickly and economically prepared. No brain work has to be expended to get a neat and effective "set up." The printer does that for you. You tell him roughly what you want and how many to run off. That is all. In a few hours, if necessary, he shows you a proof and in a few hours more your letter heads are off the press and ready for use.

This is the "hurry up" method and therefore the most popular. Often it is possible to secure a plain printed letter head of merit—even of striking attractiveness. But it is much more difficult to produce pleasing effects with type than with lithography or embossing.

Using cuts often helps to "make" a letter head. It is equally true that cuts may spoil a letter head if poor ones are used. The kind and quality of paper has a great deal to do with obtaining satisfactory results from

Established 1866.

GEORGE A. ELLSWORTH

CONTRACTOR AND BUILDER

Welland, Ontario.

Estimates Furnished.

Welland, Ont. *190*

PLANS AND ESTIMATES FURNISHED

YARD AND OFFICE
VINE AND HIATT STREETS

JOHN R McCORMICK

BUILDING CONTRACTOR

LEBANON, OREGON

118 WEST SIXTH STREET

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Dunkirk, N. Y., ... 191

CITIZENS LUMBER CO.

THE HOME OF QUALITY

BEST OF EVERYTHING IN BUILDING MATERIAL

PHONE NO. 10 C. E. DRAGOUN, MANAGER

AMES, IOWA.

Phone Haymarket 1891 *Established 1855*

D. Goodman & Company

Carpenters and Builders

Building Repairs of All Kinds *Jobbing Promptly Attended to.*

516 South Centre Avenue

Chicago, ... *191*

cuts. If you use a halftone you must use a smooth stock.

A process of printing has recently come into use which is known as "offset work" which permits the use of halftones on bond paper or other rough stock. But "offset" printing has not become common enough to be in use in the average printing plant in the smaller places such as the majority of readers of this publication would be likely to patronize.

However, the care necessary to be exercised in using cuts should not deter any contractor from using them provided he has cuts that are appropriiate.

Type faces play an important part in making the printed letter head attractive. In the lithographed letter head the lettering is generally hand drawn but where plain printing is used, recourse must be had to regular type forms. Of these perhaps the best is Caslon Bold or Caslon Bold Italic or a combination of both. Upper and lower case, that is Capitals for the initial letter of each word with small letters for the remainder, should be used. This arrangement, so we are told, is more readable and more distinctive than all capitals. Hence the preference.

The use of two or even three colors adds much to the attractiveness of a printed letter head. Some striking and elegant effects may be obtained by the use of red and black or red and green or green and black, etc.

One large manufacturing firm has a unique letter head in which the first letter of each word is a capital printed in red. The other letters are "lower case" printed in black.

The climax of quality and refinement is attained in embossed letter heads. Embossing conveys the impression that the best is none too good for the person or firm using it.

Embossed letter heads are more expensive than either lithographed or printed as a general rule. The cost depends upon the amount of lettering and area to be engraved. For embossed work a copper plate must be made and the letters or design carefully etched in—a work requiring skill and time.

A new process of printing which simulates embossing very cleverly is being advertised and is claimed to be very successful but like "offset" printing it is not yet in general use. Consequently it would not be likely to be available to the readers of this publication.

Some of the letter heads submitted in the prize competition are herewith reproduced. They are interesting rather for simplicity than for originality or cleverness. They are typical of the letter heads received and of the style of letter head in use by the rank and file of contractors and builders throughout the country.

While there is unquestionably room for improvement, most of these letter heads are decidedly "not bad." Allowance must be made for the fact that in the smaller towns the contractor does not have the advantages of the most modern and completely equipped printing establishments.

"Offset work," embossing, and lithography are therefore out of the question for him unless he sends his work away to one of the larger cities where such work is done. This he hesitates to do when in a few hours or certainly in a few days, his local printer will deliver a job that "serves the purpose," costs a whole lot less and saves much fuss and correspondence.

The fact, however, that some time, thought and expense must be expended to get a letter head that "stands out," should not influence the contractor to continue with a letter head that fails to do him credit.

Even in the matter of letter heads, self-satisfaction is to be condemned. Remember, your letter head is as much your representative as though it were the flesh-and-blood carrier of your messages.

Some of the letter heads submitted in the NATIONAL BUILDER prize contest are reproduced herewith. The first prize of $5 has been awarded to John R. McClintock, Lebanon, Ore. This letterhead is notable for simplicity, good taste and the essential air of quality.

J. B. WHITE M. E. WHITE

J. B. WHITE & SON

ARCHITECTS AND SUPERINTENDENTS

CLARION, IOWA

S. L. WILLIAMS,
Contractor and Builder.

Greensboro, N. C., ..., 19

J. S. Bachmayer A. W. Bachmayer

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Contractors and Builders

Plans, Specifications Estimates Furnished

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Faulkton, S. D., ... 191

W TWILLEY MALONE
CONTRACTOR AND BUILDER

ARCHITECTURAL DRAWING A SPECIALTY
AGENCY FOR AMERICAN COLONIAL COLUMN AND EDWARDS SPANISH TILE

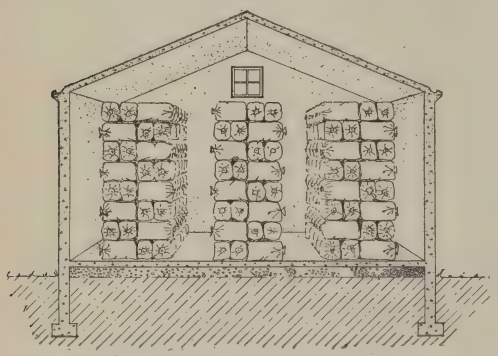
Allen, Md., ——— *191*

EUGENE R WHEELON
GENERAL CONTRACTOR
825 E NINTH SO
SALT LAKE CITY

The Storage of Portland Cement

By PERCY H. WILSON.

Portland cement is easily affected by moisture. It is purposely made so; for, combined with water and other substances, it forms the best of all building materials—everlasting concrete. But moisture must be kept away from cement until it is needed for actual use. This means that cement must be stored in places which are and can be kept absolutely dry. Upon the proper storage of cement are dependent the reputation of the contractor



or builder, the trade of the local dealer, and the satisfaction of the user.

TEMPORARY SHEDS FOR CONTRACTORS AND BUILDERS.

On account of the quantity which they keep on hand, dealers and contractors often build special houses for the storage of Portland cement. Almost any material will do for the construction provided it will shed water and will remain weather-proof. Frequently, for temporary storage, contractors build sheds of "up and down" plank covered on the outside with one or more thicknesses of tarred paper. The floor must be above possible high water and open so that the wind can circulate under it. To make the house more completely damp-proof, the floor should be double or its equivalent. Often the same effect is obtained by a make-shift double floor of loose timbers and boards laid upon the regular floor. For such temporary shed, there is nothing better than a well-made one-way-slope tarred paper roof on sheathing laid with tight joints lengthwise or in clapboard fashion crosswise. Let the roof have a drip or over-hang of at least a foot on all sides. See that it is absolutely water-tight, that the rain cannot beat in under the eaves, and that the roof is fixed so firmly that a wind-storm will not raise it. It is advisable to put no windows in such a house and to have the door so securely hinged and fastened as to keep out intruders. Where use of cement in the work is dependent upon acceptance by test, provision for piling should be made in accordance with instructions given below for dealers.

STORAGE HOUSES FOR DEALERS.

The same general principles stated above apply to storage houses for dealers. Naturally the house is made more permanent in character. Consequently, it should be supported by a concrete foundation extending into the ground below the frost line. Likewise, for a permanent building, there is no material so good as well-proportioned concrete. Place the concrete floor on sufficient coarse, compacted gravel or broken stone fill to bring the floor level a foot above the surrounding ground. Slope the surface of the floor toward the door. For a one-story building, a 6-inch reinforced wall is strong enough. With a reinforced concrete roof, the cement will be protected from all possible danger of dampness.

The size of the house is dependent upon the extent and character of the dealer's trade. An average carload of Portland cement contains about 175 to 200 barrels of four bags each. In determining the necessary size of the cement sheds, consider that each bag of cement stored will occupy one cubic foot. Do not build too small. There is an increasing demand everywhere for Portland cement and the trade of local dealers is far surpassing expectations.

The character of the trade has much to do with fixing the size of the storage house. Especially dealers who supply contractors should have sufficient room to keep every shipment separate; for cement used by contractors and builders must often pass a seven- or twenty-eight-day test before being used. Moreover, every cement storage house should be large enough to have aisles between the piles of various shipments, so that cement may be removed from storage in the same rotation as it was put in.

STORAGE FOR USERS OF CEMENT.

Many users of Portland cement need to store it only for the short interval between the time of hauling it from the dealer and using it in the concrete work. Any building with a good roof, tight side-walls, and a dry floor will do. Make a temporary double floor by means of small beams or logs and loose boards. See that driving rains or damp air cannot reach the cement.

DIRECTIONS FOR STORING CEMENT.

Portland cement weighs nearly 100 pounds per cubic foot, therefore judgment must be exercised in loading the floor. Likewise, on account of its weight and possible damage from dampness, do not pile the cement against the side-walls of the building unless the house is full-lined or skeleton-lined on the inside. Store the cement so as to leave an open space or an aisle along the side-walls and aisles at places necessary to separate shipments. Get rid of all possibility of the cement piles toppling over by laying the bags, as a mason would say, "headers and stretchers," that is, alternately lengthwise and crosswise, so as to tie the pile together. Examine the building frequently to see that there are no leaks in the roof or sidewalls.

Even on the work, never pile cement on the ground or on bricks. Throw down a few blocks, lay boards upon them and make a dry floor for the cement. Have just enough cement on the work to keep things going. A good tarpaulin is handy to cover up the cement in case of a sudden shower. Always buy cement from the dealer who has a dry store-house. If the cement in the bag has been wet, it is hard as a rock; do not use it under any circumstances. However, do not

mistake lumps caused by pressure in the store house for "set-up" cement. Such lumps crumble easily and the cement is perfectly good. Take care of the Portland cement just as carefully after receiving it as a good dealer does, and, properly mixed with sand and stone or gravel, it will yield a building material proof for all time against fire and repairs.

Colored Concrete

IN USING concrete for decorative purposes it is frequently desirable to have the finished surface colored. The average contractor is, as a rule, not thoroughly familiar with the processes by which the various tints may be obtained. The coloring effects are obtained by adding certain coloring matter to the cement and sand before the water is added. Great care, however, should be exercised in the promiscuous use of coloring materials in order to obtain the desired colors and also to guard against the addition of injurious substances. Cement Age gives the following methods for obtaining various colors, these recommendations being based upon the experience of a noted American authority. Statement is made that the quantities given are per barrel of cement, the coloring matter in each instance being mixed dry with the cement and sand. Caution is given that Venetian red and common lamp-black should not be used, as the color obtained with these materials will run and fade. The various colors and quantities of coloring material per barrel of cement are as follows:

For brown, 25 lbs. of best roasted iron oxide; or 15 to 20 lbs. of brown ochre.

For black, 45 lbs. of manganese dioxide.

For blue, 19 lbs. of ultramarine.

For buff, 15 lbs. of ochre. (This is likely to considerably reduce the strength of the mixture.)

For green, 23 lbs. of greenish blue ultramarine.

For gray, 2 lbs. of boneblack.

For red, 22 lbs. of raw iron oxide.

For bright red, 22 lbs. of Pompeiian or bright English red.

For purple, 20 lbs. of Prince's metallic.

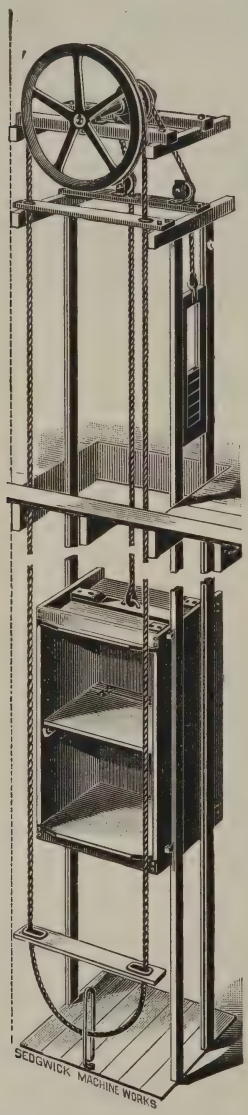
For violet, 22 lbs. of violet iron oxide.

Dumb Waiters

By J. I. WAKELEE. President Sedgwick Machine Works.

(Continued from May.)

SHOULD builders buy complete dumb waiter outfits, or should they buy machines only, build their own cars, get out their own runs, and purchase locally counterweights and ropes?



One manufacturing firm which is an authority states that many years ago they put up a factory building designed exclusively for the manufacture of machines, anticipating that builders all over the country would furnish the balance of the outfits themselves. It was soon found, however, that no matter how perfect a machine was sent out, if the rest of the outfit was not suitable, trouble and dissatisfaction resulted. These manufacturers, therefore, put up another building fitted with the most improved type of machinery, devoted exclusively to the manufacture of the woodwork. A careful record of their sales has been kept and it is found that builders all over the country do better to buy complete outfits and hold the manufacturer responsible for every part of same, than to buy the machine in one place, get out the woodwork themselves, depend upon a local hardware dealer for rope, and take what they can get in the way of counterweights from the hardware store or from some foundry.

The very best manila rope is unsuitable for the hand rope of dumb waiters, because the manila fiber will pierce the skin and remain there invisible and irritating. Nothing but specially made and laid rope of proper fine fiber will satisfy the demands of the user for a dumb waiter hand rope, and this rope is not carried in stock by the hardware trade.

This is only one example of the difficulties the builder has who endeavors to assemble or make a complete dumb waiter outfit, and he avoids all of these troubles by purchasing the outfit complete, of size and type suitable for the requirements of each job.

If the builder purchases the outfit complete, comprising the machine, and preferably the platform on which it is to be mounted, the car fitted with proper guide shoes, the counterweight suitable to the size and weight of the car, the guide runs, the ropes, and if he installs this outfit in accordance with drawings and directions furnished by the manufacturer he may depend upon obtaining satisfactory results, and if there is any difficulty or dissatisfaction it can be very easily ascertained whether the fault is in the material supplied by the manufacturer, or is in the manner in which he has himself installed the outfit.

Builders having had the greatest amount of experience in connection with the in-

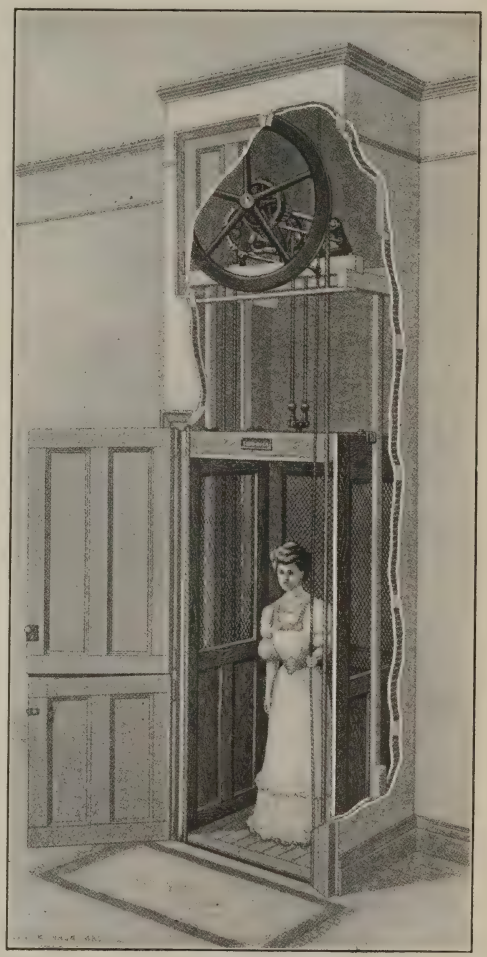
stallation of hand power elevators and dumb waiters invariably decide that it is better to purchase complete outfits.

The installation of hand power elevators in many different classes of buildings and for many different purposes is becoming more and more common. In the larger private residences hand power elevators are installed as trunk lifts and for carrying baggage, furniture, and other bulky or heavy articles up and down stairs, not only in order to save time and strength, but to save walls, floors, ceilings, stairs, etc. In many homes the installation of a hand power elevator to be used as an invalid lift is necessary because some member of the family is unable comfortably to walk up and down stairs. For use as an invalid lift, the builder must be very careful not to make a mistake in the selection of the outfit which he will install, because an inferior outfit is not only dangerous and unreliable, but it is a perfect nuisance in every way in which it ought to be a convenience.

The most improved type of hand power invalid lift is not only strong, durable, easy running and quiet, but it is fitted with an automatic brake which makes it absolutely safe.

A manufacturer with whom we are acquainted has installed four of these outfits in the homes of four brothers, one of whom is a well-known banker of New York City. The elevator installed in the banker's residence in New York was the last of the four installed and in placing the order for this invalid lift the banker stated that as a result of his experience with these elevators which had been installed in his brothers' homes, he would rather have one of these improved automatic brake invalid lifts than any electric or hydraulic elevator ever built, even if the hand power elevator cost as much as the electric or hydraulic elevators, because not only is the hand power elevator referred to safe, but it is perfectly dependable because of its extreme simplicity; there is no fear in the mind of the passenger that something may go wrong and the elevator go out of business while he is suspended between floors.

Hand power elevators to be used in cellars and basements under the sidewalk for the removal of ashes in banks, institutions, and other large buildings, are becoming very general, and the use of hand power elevators in stores, warehouses, factories, stables,



Sedgwick Invalid Lift.

garages, etc., frequently meets all requirements at a materially less cost than would the installation of power elevators, and the maintenance cost of the hand power elevator, if of good design, material and construction, is practically nothing at all.

A good dumb waiter or hand power elevator, properly installed, is a great convenience; a poor one is a nuisance.

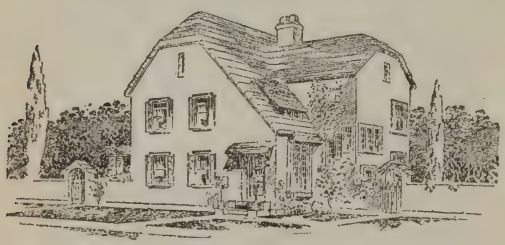
(To be continued.)

A $4,500 House

The elevation and plans shown herewith are for a house which is estimated to cost—complete—$4,500.

They are the plans which took first prize in a recent competition of the Building Trades Employers Association in which more than 200 architects from all parts of the country took part.

In this branch of the competition architects were invited to submit plans for buildings not to exceed $4,500 in cost not including plumbing and plumbing fixtures and heating. The plans here reproduced are the work of Stephen Goossen of Detroit. These



Elevation.

plans were chosen by a board composed of Donn Barber, Grosvenor Atterbury and William A. Boring, who also passed on the estimates of the cost and found them satisfactory,

The estimates of cost for this building are:

Excavating	$ 60.00
Concrete footings, cellar floor, terra cotta block walls	1,661.00
Chimney	90.00
Roof (frame, shingles, labor, material)	580.00
Inside plastering	260.00
Inside and outside finish	980.00
Doors and windows	210.00
Finished floors	180.00
Painting and glazing	198.00
Walks, grading, etc.	90.00
Tin work, flashing, etc.	51.00
Fixtures	100.00
Total	$4,460.00

The general specifications provide for:

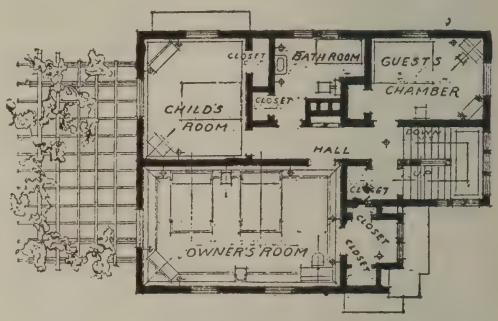
Basement walls, terra cotta blocks, size 8 x12x12 in.

Entire basement is to have a concrete floor.

Building to be frame and tile construction.

Joists: first floor; 2x8 in.—16 in. on center.

Joists: Second floor; 2x10 in.—16 in. on center.



Second Floor Plan.

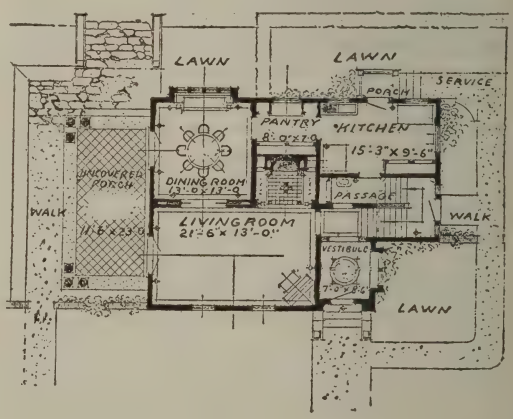
Joists: Third floor; 2x8 in.—16 in. on center.

Rafters; 2x6 in.—20 in. on center.

Living room: alcove room, stair half and vestibule, ash finish; stained, weathered.

Dining room; pine painted white.

Passage between kitchen and stair hall is



First Floor Plan.

to be ash finish; stained weathered.

Kitchen and pantry; pine finish, painted white.

All second story finish is pine, painted white.

The attic stairs and finish in the rooms of the attic are to be yellow pine. All to be left with natural finish.

All the rooms throughout must be plas-

tered, including the stair wall to the basement and also attic rooms.

The tile work on porch floor is to be a dull green and color to be left natural.

The floor in the vestibule and floor and upper portion of the fireplace are to be tile of a dull blue tint.

The living room to be panelled, also the stair hall to second floor line as shown on section drawing.

Panelled wainscoting is also required in back of seats in alcove room, to bookcase, each side of mantel.

All to extend up 7 ft. from the floor, except in the stair hall, there the panelling to be made as shown.

The roof is to be shingled with a thatched effect.

All the interior woodwork is to be cypress, including the window frames, porches, etc.

There is a third floor to this house not shown on the accompanying plans, containing two maids' rooms and a bath between them, and a large room for storage. This floor is reached by a continuation of the main stairs.

Proposed Specifications for Hollow Tile Building Blocks

By VIRGIL G. MARANI, Building Inspector,
City of Cleveland, Ohio.

FOR several years the building department of the city of Cleveland, Ohio, has taken an active interest in the subject of the use of hollow clay tile as a substitute for brick in the construction of load-bearing walls. As a result, the conviction has been forced upon the department that the subject was worthy of careful and thorough investigation. In order to secure all possible data relating to the subject, exhaustive tests were made by the building department direct and also by competent engineers acting in harmony with the department, and in conjunction with one of its engineers, to determine the strength, stability, fire-resisting qualities, etc., of hollow building tile.

In the crushing tests, a large number of samples were gathered from different places; some from the yards of the manufacturers and some from the sites of buildings under process of erection. A complete range of quality of tile was thus secured and tests made to determine absorption and crushing strength. All tile tested were first carefully measured and a complete detailed record kept of each tile throughout the entire test.

Some of the tile were built up into columns of different dimensions and with tile laid in different positions in the various columns and then tested for crushing strength; other tile were tested singly. From the results of these tests it was found that where the tile did not absorb more than 12 per cent of their weight in moisture, with vertical webs spaced not more than 4 inches apart, center to center, and with web thickness at least 20 per cent of height and blocks placed so that the vertical webs occurred directly over each other, no single tile or column failed under a less load than 3,645 pounds per square inch of vertical web section.

Under the authority vested in the inspector of buildings by the Cleveland Building Code, the writer ordered a fire test to be made to determine if hollow tile, erected as a wall supporting a heavy uniformly distributed load, would satisfactorily stand the fire test prescribed by the ordinance. A testing inclosure was built with 12-inch walls having outside dimensions of 9 feet 6 inches by 10 feet 3 inches by 8 feet 9 inches high, with a 3-inch coping of concrete on top. The entire top of the walls was loaded with an evenly distributed load of about 4,066 pounds per square foot.

The internal temperature developed was over 2000° F. at the upper pyrometer and 1600° F. at the lower; the outside wall surface remained cool throughout the entire test and showed no warping, settlement, or cracking of any kind. After the water had been turned on and the fire quenched, it was found that the inside plaster had been burned off, but the inside face of the hollow

tile was true and no apparent damage evident. Later the rear wall was further loaded to an evenly distributed load of 9,487 pounds per square foot without showing evidence of crushing, cracking or disintegration of any sort.

After thus determining the properties of hollow tile from tests, the next step taken by the department was the framing of a suitable specification regulating the safe use of these tile for load-bearing walls and the revision of the building code relative to the subject.

It is evident to the writer that hollow tile can be safely used in the construction of load-bearing walls, only when proper specifications are followed. The specifications must treat them from the standpoint of their supporting webs and not as solid units. The tile must be hard burned. Vertical webs must be spaced not too far apart, and their thickness must be proportioned to their height. All vertical webs must stand in vertical alignment with vertical webs in adjacent tile below and there must be mortar between tiles under the vertical webs. The following specifications cover these points, amply safeguard the use of hollow tile for load-bearing wall construction and at the same time are readiy complied with by builders and tile manufacturers.

The limiting of the width of beds that the tile are susceptible of is a most important feature. The mason cannot be relied upon to bed properly and thoroughly a large unit with a broad bed. The mortar is likely to be omitted from a portion of the bed and vertical webs be left without a supporting mortar bed. By limiting the width of the bed that the tile is susceptible of to 4½ inches (width of common brick), a good bedding will be as certain as in common brick work.

The accompanying cuts illustrate two forms of tile that are used in this market and which comply with the specifications herein proposed.

From the results of the experimenting the department has done and the consideration given the subject, the writer recommends the following as the essential points to be covered, by building law restrictions, in permitting the use of hollow clay tile for the construction of load-bearing walls:

TENTATIVE SPECIFICATION FOR HOLLOW CLAY TILE.

(1) Quality of tile: Tile to be made of shale or fire clay or any clay that will burn to a good dense body without undue warping or checking and must be burned to such a degree of hardness that they will not absorb more than 12 per cent of their weight in moisture.

(2) Webs: Vertical webs should be spaced not more than 4 inches apart, c. to c., and should have a thickness of at least 20 per cent of their height.

(3) Bedding: To secure thorough bedding, tile should be so constructed as to preclude mortar beds of more than 4½ inches (same as brick work) in width, and should be laid with broken joints and be thoroughly bedded and bonded.

(4) Quality: Tile should be true and free from injurious checks and cracks.

(5) Position in Wall: Tile should be so laid in walls that all vertical webs are in vertical alignment with vertical webs of the adjacent tiles below.

(6) Loads: Hollow-tile walls should be loaded with not more than 200 pounds per square inch of vertical web section.

(7) Thickness of Walls: Permissible thickness of walls same as for common brick.

(8) Joist Bearing: Where joists or beams are seated in walls, they should have a bearing extending over at least two of the vertical webs.

It will be noticed that the above specifications only contemplate the use of hollow tile when laid with their voids horizontal. This has been done advisedly. The vertical type has been avoided, not only from the standpoint of insufficient bedding and bonding, but also from economical considerations. In the first place, the end of a tile web is too narrow (½ or ¾ inch) for the mason to apply a mortar bed in a practicable way and in the second place heat nonconductivity is defeated in walls where the voids of the tiles are vertical. In order to secure nonconductivity, the tiles must be set in the wall with their voids horizontal. If the voids are vertical, opportunity is given for up and down circulation of air within the wall, with the following result:

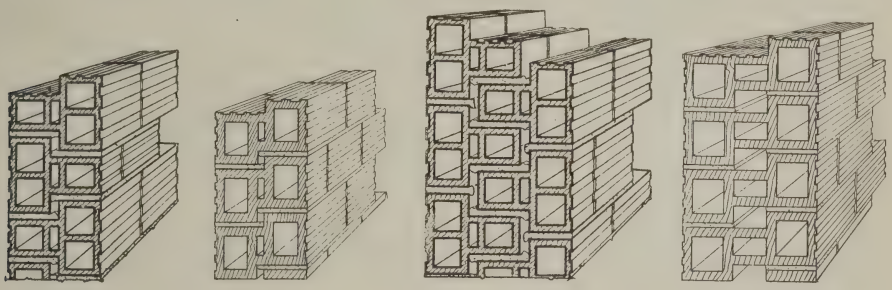
In summer the sun heats the exterior face of the wall. This heats the air in adjacent voids within the tile. The voids being vertical, this heated air rises to the top of the

wall. While the heated air is rising, the cooler air within the vertical voids adjacent to the interior face of the wall is falling, and. since it is impracticable to prevent communication between the exterior and interior vertical voids, circulation within the wall takes place, the air going up one side and down the other, transferring the heat from one face of the wall to the other. In winter the same operation takes place, except the air currents take the opposite direction, and nonconductivity is not secured.

If, on the other hand, the tile are laid with voids horizontal, circulation within the walls is prevented; the air is confined and a nonconductive wall is secured.

tured, tile by the "stiff clay," and common brick by the "soft clay" process. A given weight of clay made into properly constructed hollow tile builds as much wall, of equal strength and far less conductivity than double that amount of clay made into common brick by the "soft clay" process, by which they are made.

The more the writer has studied the subject of building with hollow tile instead of common brick or wood, the more he has felt that it is a subject well worthy of careful investigation by engineers and architects, and that cities should avail themselves of the use of this valuable form of construction by adopting specifications that properly



8-inch Walls. 12-inch Walls.

FORMS OF CLAY TILE WHICH COMPLY WITH BUILDING REGULATIONS.

It will also be noticed that, although no single tile or column failed under a less load than 3,465 pounds per square inch of vertical web section, the above specifications limits the permissible load to 200 pounds per square inch of web section (a safety factor of about 17). This 200-pound load, when applied to tile as ordinarily made for load-bearing walls, permits their being loaded over 5 tons per square foot of wall area.

There is marked difference between the clay body of the webs of hollow tile and that of common brick. This results from the different process by which each is manufac-

prescribe its use. Cleveland architects, as well as those in some other localities, are recognizing that they can build tile residences, many of them stuccoed on their exterior, practically as cheap as frame and that are enduring and fireproof.

The suggestions embodied in the above refer particularly to tile laid with voids horizontally.

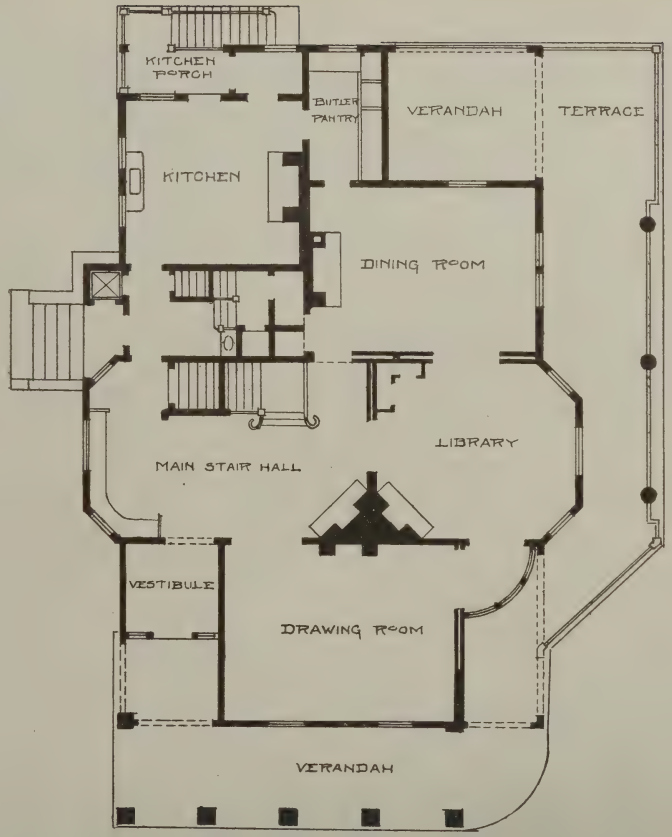
If it is desirable to use tile laid with voids vertically, a specification regulating this type of construction should be adopted in addition to the above specifications.—*Engineering News.*

A House at Jamestown, N. Y.

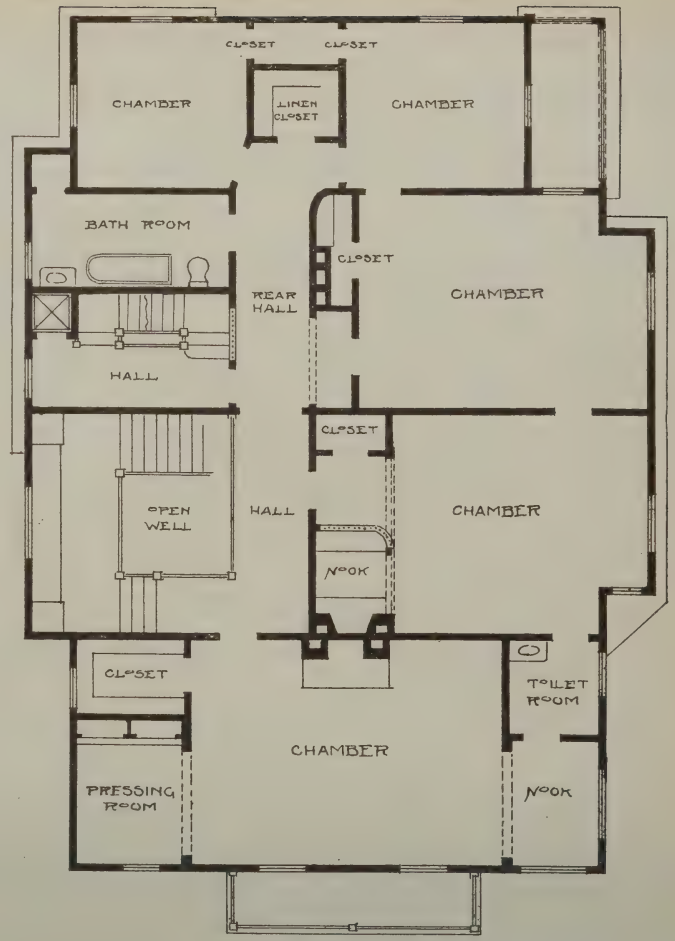
E. G. W. Dietrich, Architect.

A House at Jamestown, N. Y.

E. G. W. Dietrich, Architect.



A House at Jamestown, N. Y.



E. G. W. Dietrich, Architect.

Getting the Length of Rafters

By DWIGHT L. STODDARD.

THERE has been so much written, not only in building papers, but in books as well, that it seems sometimes that the subject of roof framing had been covered

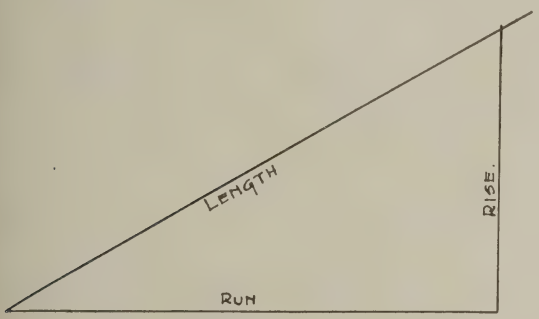


FIGURE 1

over and over again; and truly it has; and yet since we come in contact every day with good mechanics who either don't cut a roof at all, or make mistakes and get all mixed up in the matter, I have decided to just write a bit of the simplest part of it, hoping that some of these mechanics will see how easy it is and will never again be afraid of roof framing.

I worked on a big house recently, where the foreman cut the main roof, that is he laid it out for the carpenters to cut; but when it came to the many little projections, where a little roof of short rafters had to go to an exact place, he let me do all my

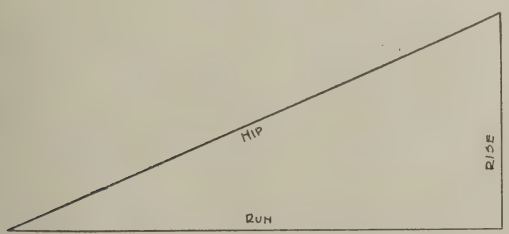


FIGURE 3

own laying out and seemed surprised that I did not have any trouble.

I mention this to illustrate the fact that a big roof, although quite complicated, does not seem as difficult as a little projection roofed over to strike the main roof at an exact place. Now the reasons are not at all difficult to see. If you get the right general idea the main roof will all come along all right. It has no given place to stop, except to stop where the rafters come together at the top, and if there had been a slight mistake in the beginning, if it was all carried along with the same calculation, if there had been a mistake of even a few inches, possibly no one would ever know it, as the roof would be practically the pitch you started out to make it.

But on a short rafter, especially where you have hips, valleys, uneven pitches, etc., to contend with, you must not only realize just what your actual measurements are, but

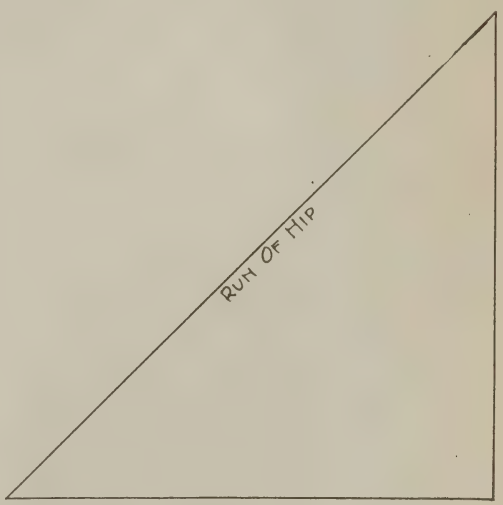


FIGURE 2.

all about your cuts, for in these short rafters not only a few inches would make a lot of difference, but even the thickness of saw kerf would make a difference.

Since these jobs just mentioned I was working on an ex-Senator's building. The foreman there laid out all the main rafters and he too left all the short and uneven pitch rafters for me to cut, and was pleased that I had no trouble with them. I mention these facts to show that even the mechanics who have a fair knowledge of roof framing do not really understand it as they should. They know how to cut rafters and yet they seem to be afraid to get right down to difficult and real accurate work.

Figure 1. Remember that all there is to get the length and cuts of rafters is to measure across the rise and run. This gives the length. The rise and run cut on rise gives top or plumb cut, while run and rise cut on run gives bottom or level cuts.

Now this length can be taken by measuring across the square, using inches as feet, or making a drawing and measuring the drawing, or by figuring it out by mathematics, or by any other way.

Figure 2. Measure diagonally across the run and it gives the run of common hip or valley.

Figure 3. Take this hip or valley run and the rise, and measure across that and it gives the length of the hip or valley rafter.

Figure 4. In measuring to get rise and run as well as length of any rafter, especially rafters that have to go up under a window sill or other accurate place, be sure you take everything into consideration.

Note the measuring up of the heel; note

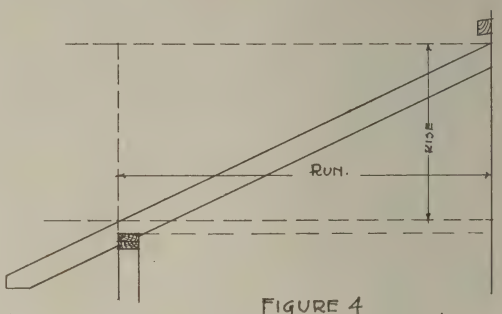


FIGURE 4

the allowing for the sheathing and shingles on top of the rafters. In other words, be sure you are right and then go ahead, and you will always be all right, it matters not what kind of a rafter you have to cut.

Knots, Hitches and Splices

By F. S. UPTON.

IN a recent issue of the NATIONAL BUILDER, I. K. S. says he has seen nothing in your magazine relating to hitches made with ropes or the manner in which they may be spliced.

I too, have been a reader for some time and thought about this very thing and recently have had the opportunity of learning something on the subject and pass it on for what it may be worth to your large army of readers.

Nearly every builder and contractor uses rope many times during each year and if he has an idea how to use it rightly may be able to save many dollars because of this knowledge. It will not only be a convenience but a saving of time to make a certain knot or hitch adapted to the work on hand.

In the Cornell reading courses taken up at Ithaca during the past January, some valuable lessons were taught along this line and I know of no better reference than these lessons from which I quote in part.

We all know the various kinds of rope, which include hemp, cotton, wire, etc. The supply of true hemp rope has been limited within the past few years, but other substitutes have been found which seem to answer the purpose.

When used in a tackle or for hoisting, the rope is bending and straightening as it goes around the pulleys, causing the strands to chafe at the center of the rope. The smaller the pulley the worse this becomes.

For this reason, says Howard W. Riley, in the lessons referred to, it should run over a pulley of a diameter not less than eight times the diameter of the rope. Rope used for transmitting power should have pulleys forty times the diameter of the rope.

Knots make a rope weak because it is bent in order to form the knot and the outside takes the strain at the bend. These are overworked and break. The strain now rests on fibres below which in turn weaken and break.

Mr. Riley goes on to tell us that it makes a vast difference even in the way a rope is coiled. Because of the way it is twisted in the manufacturing,. it should be coiled as with the hands of a clock. In uncoiling, the end last laid down should never be pulled up from the top.

If for any reason this must be done, turn the whole thing over and draw the end up through the center.

The bends which a rope undergoes in the

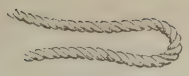


FIG. 1.
BIGHT

FIG. 2.
LOOP OR TURN

FIG 3.
ROUND TURN

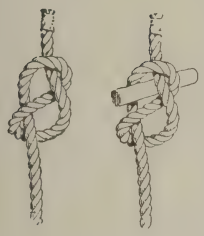


FIG. 4 FIG. 5.
FIGURE EIGHT KNOT.

FIG. 6. FIG 7.
STEVEDORES KNOT

FIG. 8.
A TIMBER HITCH
AND A HALF HITCH
COMBINED

FIG. 9.
HALF HITCH

FIG. 10
TIMBER HITCH.

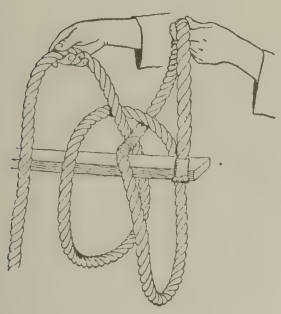


FIG. 11.

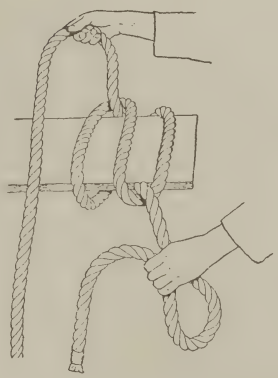


FIG. 12
SCAFFOLD HITCH.

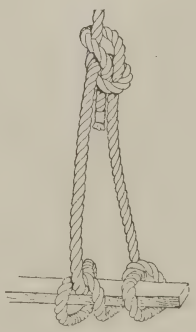


FIG. 13.

FIG. 14.
GRAIN BINDER KNOT.

FIG. 15.

FIG. 16.
SQUARE KNOT.

FIG. 17. FIG. 18
GRANNY KNOT.

formation of a knot is of three kinds: The bight, loop or turn, and the round turn. A bight is formed by simply bending the rope with the sides parallel. The loop is made by crossing the sides of a bight; the round turn consists in the further bending of one side of a loop.

The figure eight knot is used for making a knob on the end of a rope or for keeping the strands from untwisting. It may be untied easily.

Form a bight near the end of the rope, give the short end one complete turn about the long rope, and pass it up into the bight. Figure 4, pull short stick, or shackle, as shown in Figure 5, the knot may be easily untied.

The Stevedore's knot is used for making an extra large knob on the end of a rope. It is tied the same as a figure eight knot, except that two turns are taken around the rope instead of one, and it may be made either without or with a shackle as in figure 6 and in figure 7.

There are several kinds of hitches some of which we are very apt to use incorrectly. Sometimes a half hitch is merely a loop around the rope with the free end pinched between the rope and the post or whatever it may be attached to.

A "timber hitch" which is used a great deal by carpenters is made by passing the rope around the timber, taking a half hitch around the rope and then passing the free end once more between the rope and the timber.

A timber hitch and half hitch combined is fine in handling long articles which must be kept in line with the pull of the rope. The half hitch should be around the object and around the rope. In many instances the carpenter needs a single board scaffold hung by a single rope at each end and here Mr. Riley says the ropes must be attached to the board in such a way that the board will not turn. He then proceeds to teach us how to make the scaffold hitch.

By the cowboy's method or the circus method for a clove hitch of ample size so that when placed over the end of the scaffold plank it will hang loosely below it, as in figure 11. Draw to the left the rope in the left hand in figure 11 and to the right the rope in the right hand in the same figure, thus gaining the position shown in figure 12. Turn the plank over, draw the ropes up above it, join the short end to the long rope by an overhand bowline, pull the bowline tight, at the same time adjusting the length of the two ropes so that they hold the plank level, and the hitch is finished as shown in figure 13. Attach a second rope to the other end of the plank in the same way and the scaffold is ready.

In tying up bundles of lath we need a hitch which will slide along a cord in one direction but will hold against moving the other way and such a method is called the "Jam hitch." Pass the cord around the bundle bringing the short end beyond the long cord and from right to left bend the short end to the right to form a bight around the long cord. Pass the end upward inside the bight and next to the long cord. Pull the hitch up tightly so as to pinch the long cord. You can slip it down now and tighten the loop around your bundle.

We often have occasion to fasten a rope to a hook. In this we are taught the Blackwall hitch. This is made by using a half hitch about the shank of the hook. From a bight in the rope and pass it under the back of the hook. Cross the sides of the bight to form a loop about the shank of the hook and pass the free end between the hook and the main rope.

The square knot, the most frequently used of all knots, is secure when set and may be untied without difficulty. In making it, care shuld be taken not to make a granny knot (see description below). Cross the ropes, placing the right under the left, wrap the end of the left rope around the right, and bend each rope back on itself (see figure 15.) Note the ropes A and B are on the same side of C. Wrap A around the other rope end, producing the knot as shown in figure 16, A and B being still on the same side of C. The Granny knot is frequently tied by mistake for a square knot. It tends to slip under strain and is very hard to untie when set. The point at which a granny knot may be detected is in the position shown in figure 17. Ropes A and B are not on the same side of C, as they should be in making a square knot, and when the knot is completed they are still wrong, as shown in figure 18.

Finishing White Pine

By A. ASHMUN KELLY.

WHITE pine belongs to what is known as the close-grained wood class, which comprises such woods as bass, cedar, California redwood, gum, Oregon pine, poplar, spruce, tamarack, Washington fir, whitewood and yellow pine.

Close-grained woods require no paste filling, as oak and its class does, but may be first-coasted preferably with white or bleached shellac, though often done with light liquid filler. Shellac dries quickly, though it is not as dry as appears upon the surface soon after application, for it really requires some hours to dry enough to warrant a second coat or rubbing, etc. It also rubs down easily. The best liquid filler does not sandpaper easily, nor does it make as fine a foundation for the succeeding coats of varnish as shellac does. But it is much cheaper than shellac.

When applied to the bare surface of white pine the shellac coating is known as a surfacer, for which purpose it should be applied very thin, almost as thin as its liquid solvent. Two coats of this shellac are advised as being more satisfactory than one coat. It should be well sandpapered.

An imitation shellac made upon this formula will be found quite satisfactory; one finisher tells me that it is better than shellac in some ways.

Take equal parts of raw linseed oil, brown japan and rubbing varnish, adding a little cornstarch to give body. The starch should be made up into a paste before thinning or adding to the other ingredients, using some of the turpentine that is to form a part of the mixture, after which some of the mixture of thinners may be added until the starch is thin enough to readily mix with the rest of the liquids.

This liquid filler, which it really is, is made about like paint in consistency, or rather heavier of body, and after its application it is allowed to remain for a period of time sufficient to allow it to set, when it is to be rubbed from the surface, across the grain of the wood, using a coarse cloth and rubbing the stuff into the wood. Two coats should be applied.

For exterior work white pine may be first-coated with a mixture of two parts raw linseed oil and one part turpentine, if a natural finish is desired. Oil darkens white pine, somewhat, and hence is seldom oiled, but some finishers say that for exterior wear the pine will do better to be oiled in the way indicated, and doubtless that view of the matter is a correct one. When white pine is shellaced the latter will to a certain extent keep back the pitch in knots and streaks.

Rub the shellac down well with fine sandpaper, and apply two or more coats of pale copal varnish. For exterior use apply a good exterior pale varnish.

Should the wood be uneven of color, as sometimes occurs, add a little color to the first coat of shellac, the color being whatever will most closely match the discoloration in the wood. This will make the entire surface more uniform of color. If the wood, however, is to be stained, then this provision against the discoloration may be ignored.

If the wood is strictly prime, first grade stuff, free of knots and sap, to be finished natural, and for interior use, make it smooth as possible, and make it clean and free of finger or pencil or other marks. Coat with white shellac, let this dry, then sandpaper with No. 0 paper, dust off, and give the surface two or more coats of very clear pale interior varnish.

This wood can be made much smoother with the plane than with sandpaper, the latter making it slightly rough. To effect a strictly first-class job of finish with white pine it is essential to have the surface clean and absolutely smooth. Then with first-class workmanship the result will be a beautiful specimen of wood finishing, one not surpassed in any respect by any other wood. It is especially adapted for trim of bed rooms, and when finished natural, as I have outlined the work here, with the decorations of the room in harmonious keeping, we have a chastely magnificent effect.

It is to be regretted that former generations misused this fine wood as they did, wasting it outrageously, using the finest of it for the commonest purposes, pig pens, if you will, for no other known wood equals it for general purposes, particularly for house building, trim, etc.

Sometimes we come across very dark

knots, some of large size; what can be done to hide or eliminate them without cutting them out? We might try a bleacher like this: Mix 17½ ounces of chloride of lime and 2 ounces of soda crystals with 10½ pints of water; be sure the mixture is stiff, as it does not do so well when used thin. Let the mixture stay on the knot for some time, then rub it off and note the effect; if the knot is still in evidence through its dark color, try the bleach again. In time this will effect a cure, and when the spot has been sufficiently bleached out apply an acid to neutralize the alkali.

Linseed oil, applied to white pine, has the effect of making it look muddy or cloudy. The same result follows the application of the oil to almost any wood that is to be finished *au natural.*

It sometimes occurs that the varnish scales from shellac coating, but this may surely be avoided by sandpapering the shellac, which will give tooth for the copal varnish to hold by onto the shellac.

Shellac is easily sandpapered, but difficult to rub to a finish, as copal varnish is rubbed. But it fills the wood perfectly, and will not discolor it.

Some Problems of the Jobbing Carpenter

By WM. C. A. STEVENSON.

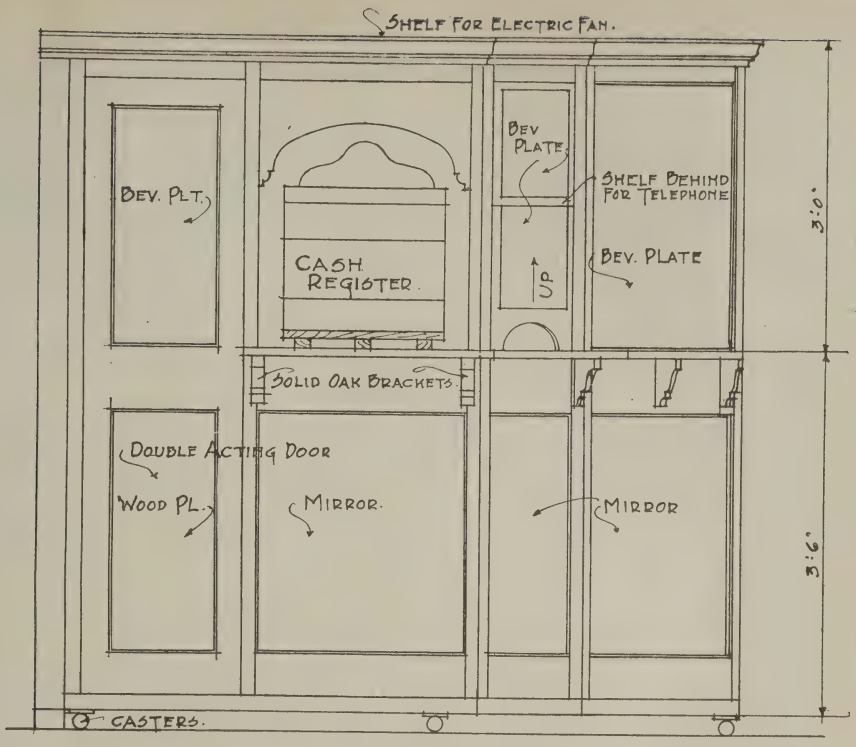
THE jobbing carpenter is brought face to face with more knotty problems that he must work out for himself than the large contractor, for the reason that the large contractor usually has plans prepared by the architect for him to follow; but not so with the jobbing carpenter. He is called in to do a piece of work, and, while his customer may know in a general way what he wants, it is up to the carpenter to work out the details.

The carpenter having a knowledge of drafting has a wonderful advantage over the fellow who has not. If you are able to show your customer what you intend to give him, it is ten to one in your favor to get the work and get your price for it, which is the all-important factor in these days of keen competition.

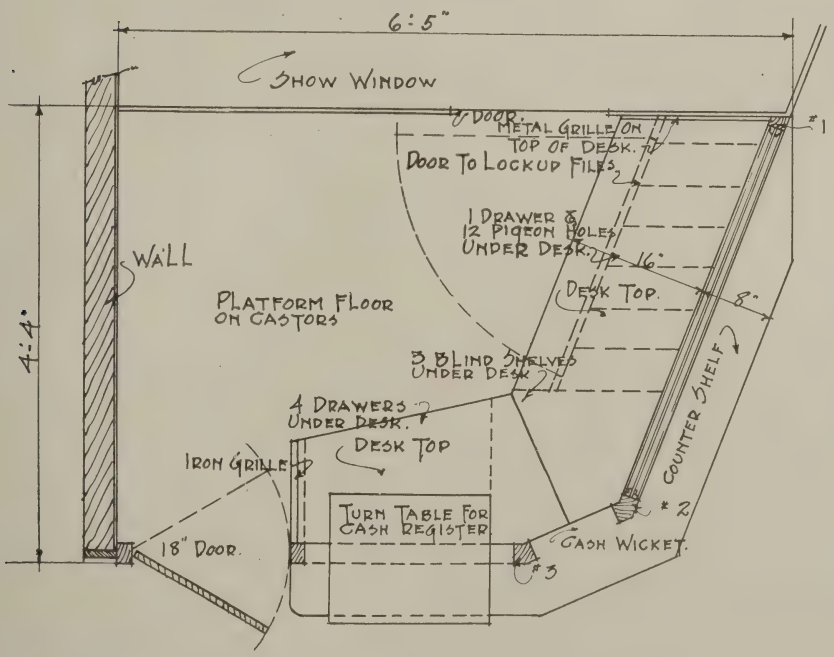
In order to demonstrate this fact, the writer showing herewith the plan and elevation of a cash office he recently built for a State Street shoe store in Chicago. In this instance, like most every case in a large city where space is of so much value, we have to provide desk room, space for files, drawers for books and stationery, etc. The whole thing had to be made so that it could be moved in order to trim the show windows; it could not be made square as it would cut off the entrance space from the street. The plan will show how the problem was worked out. It also had to be made so that it could be taken apart in order to move it from shop to store, as it could not be built in the tsore on account of the cash register arrangement to turn around on a turntable. Some scheme had to be found to prevent the register from upsetting the thing, therefore, I built a platform floor and built the upright post and desk so that it could be screwed to the platform, the weight of the platform served to prevent the register from upsetting it; then by taking it loose from the platform, it permitted it to be moved in two pieces. The turntable for the register was fixed on a pivot in the center with three swivel castors at about a 4-inch radius running around on a track. The cash wicket window had two compression plugs on each edge so that it would stay wherever left without any danger of its dropping the large drawer over the pigeon holes.

The under desk had to be made on an angle to suit the shape, so that it would pull out when office was in place. There was a door as seen on plan to close in the pigeon holes and lock them all shut with one key. On the whole the thing was a very complex problem, such as the jobbing carpenter is sure to continually meet with face to face, and unless he is able to work such problems out satisfactorily, he cannot hope to make a very great success as a jobbing carpenter.

This cash office was built of solid oak, with the exception of the three posts, No. 1, 2 and 3, which were soft wood veneered with oak. Of course, the pigeon hole and drawers were soft wood, except the fronts. When finished it made a very handsome as well as useful fixture. The mirrors were used for fitting purposes.



ELEVATION.



PLAN.

A MOVABLE CASH OFFICE.

Cost Keeping on Small Contracts

By BEN JOHNSON.

NOW it seems to me that it is easy enough to keep track of the cost of small contracts, or large ones either.

I am going to tell you how I keep cost, and some might call it, a day book. I make a note of everything I get and everything returned for each day. At night I copy it in the ledger, each item on the page where it belongs. I also keep separate accounts with everyone working on the job. When the job is finished it takes but a short time to see how you stand. To begin the job, I have my lumber bill made out and know what I am to pay for it. When they begin to deliver the lumber, I go out with my bill and check off all that is delivered. If there are any mistakes I notify the manager then and do not wait until the job is finished. If there is anything returned or anything ordered extra at any time, I make a note of it in the day book and copy it at the end of the day in the ledger.

SAMPLE OF TIME BOOK

MONTH JUNE.

JOB AT JNO. JONES.

CARPENTER JAMES SMITH.

DATE		HOURS	RATE	AMOUNT.	
SUN.	7TH				
MON.	8 "	10	.30	$3	-
TUES.	9 "	10	"	3	-
WED	10 "	10	"	3	-
THURS.	11 "	5	"	1	50
FRI.	12 "	2	"		60
SAT.	13"	3	"		90
TOTAL	14"	40	"	$12	-

I think it is a pretty good way, but perhaps some of the brothers have a still better way. I think a good way is to have a ledger, or one can use a large tablet by ruling it, which would be cheaper though not so good.

SAMPLE PAGE OF DAY BOOK

APRIL 4TH 1911		DR.		CR.	
	TO 5M. SHINGLES DR.	18	-		
	" 160 FT. BOX GUTTER "	16	-		
	BY 20 FT. RIDGE ROLL CR			1	-
	" 300 " STOCK BOARDS "			7	50
	TO 50 LBS. SPIKES DR.	1	25		
	" 1 LOAD SAND	1	-		
	BY 4 SACKS CEMENT			1	50

There should be a separate page for each kind of material, such as lumber, hardware, and everything used from different firms. I always carry a memorandum book, or, as

PAGE IN LEDGER

ALAXANDER LUMBER CO.

1911	ON JONES JOB.	DR.		CR.	
4/1	TO 800 FT. FIR FLRG @ $4.50	36	-		
4/6	" 100 " W.P.LAP SIDING @ $5.00	5	-		
4/10	BY 10-2X4X12 @ $2.50			20	-
5/2	" 150 FT. 4" SHEATHING @ $2.00			3	-
		41	-	23	-
5/2	TO BALANCE	$18	-		

PAGE IN LEDGER

HIXON HARDWARE CO.

1911.	ON JONES JOB.	DR.		CR.	
4/2	TO 100 LBS. 8" COM. @ .02½	2	50		
4/4	75 " 20" @ .03	2	25		
5/12	" 14 MORTISE LOCKS @ .75	10	50		
5/14	" 600 LBS. SASH WTS @ .02	12	-		
5/15	BY 2 PRS. BUTTS @ .15				30
5/15	BY 20 LBS. 3" CUT @ .03				60
		$27	25		90
5/15	TO BALANCE	$26	35		

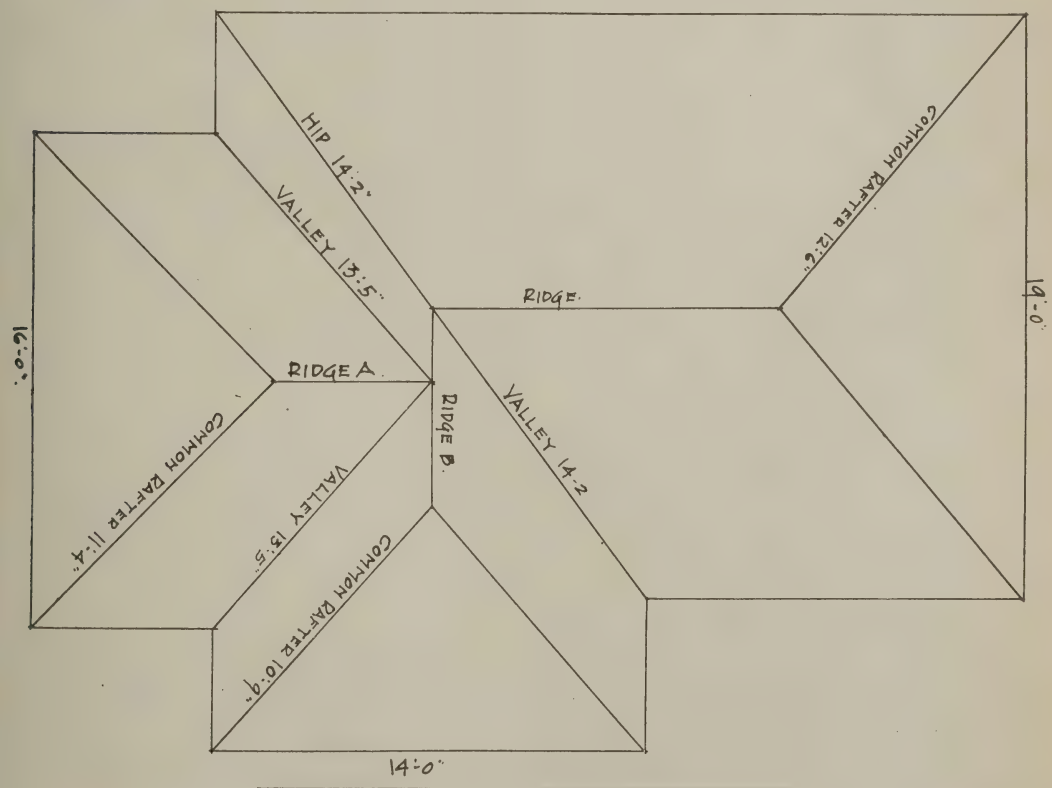
OUR READERS PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Ed.]

Answers

G. E. W., Inglewood, Cal., in reply to A. D., Sweetwater, Tenn.:

I will say that the roof has to be made with unequal pitches, so I would make the ridge of them all even as you will see. Only the hip and valley rafters will not run parallel, and this will do away with the ventilator between the ridges A and B.

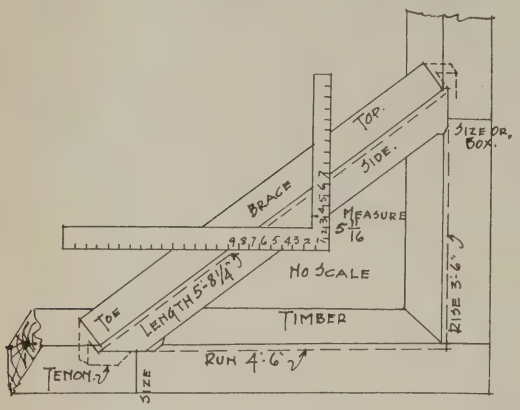


BRACE FRAMING.

From A. A. S., Chicago, in answer to Big Boy, Nelson, B. C.:

Of course, brother, you can lay out braces with even runs, as there is a rule on the tongue of all good squares, giving exact length of braces from 24 to 60 inches run, by changes of three inches. Your boss thinks you want to know too much? If he would send you to put in a brace with an odd run and you could not do it, then he would want to know why you did not know that much about framing. Study this illustration and you can frame any brace or rafter and get

its right length. First, when you know your runs, call one inch equal to one foot, and



measure across corner of square to get the length. As you speak of run 4 feet 6 inches and 3 feet 6 inches, the measure from 4½ inches to 3½ inches is 5 11/16, and represents in one inch scale 5 feet 8¼ inches, length of brace. Now then, rise and run always cut top and bottom, providing the footings are at right angles. Note how the square lays on side of brace, parallel with the timber to cut both ends. In this case the rise and run figures are too small to work handy on square for miter, so I double them. Use 7 and 9 inches instead of 3½ and 4½ inches. Be very careful and use the dotted or sub-lines for length and runs, when using stub toe braces and timber boxed to size, as shown in cut. If you have to use any odd inches on runs, let 1/12 inch equal one inch, and proceed with this same method, and if the boss wants to know where you get "fresh," tell him, "From one who knows—through the NATIONAL BUILDER of Chicago."

From Journeyman, Centralia, Ill.:

In answer to "Western Carpenter," question regarding a good working outfit, or a good set of carpenter's tools, I will tell him what I would buy.

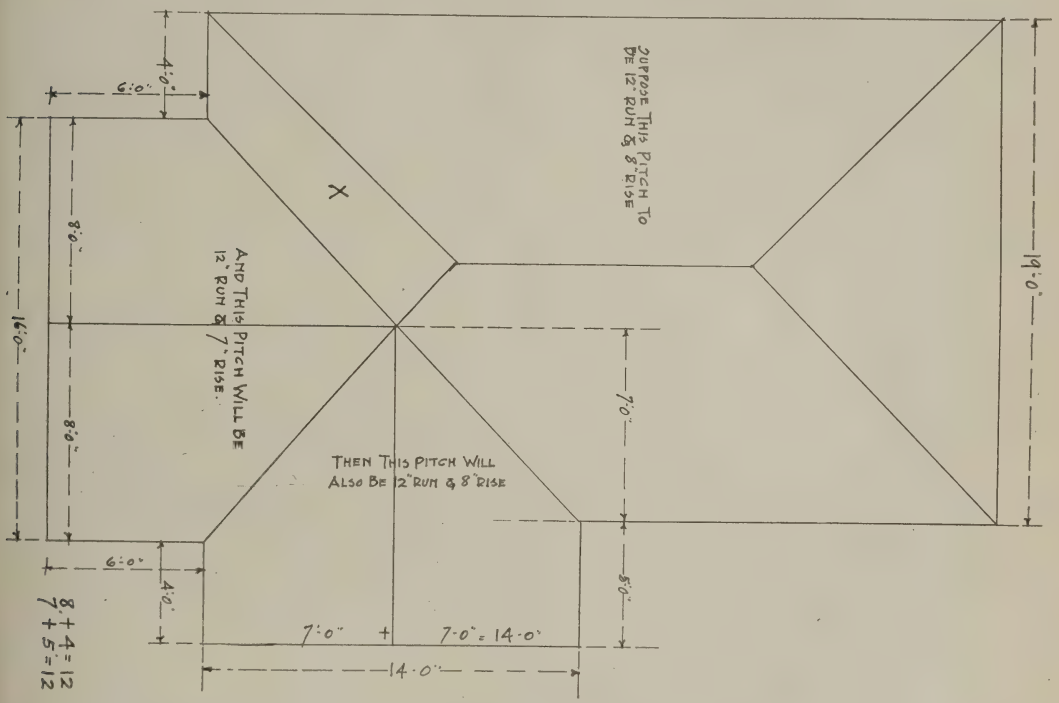
The meaning of "good outfit" depends a great deal on the class of work one does. Take it in the large cities for instance, where work is specialized—it doesn't require so many tools for certain branches, and most of them carry all they need in a shoulder box. But take it in the larger country towns where we have to do everything from patching shingle roofs to getting out the stuff and setting up nice stairs, one needs a good many different tools. The following is a list for a starter, which can be added to from time to time: Disston saws, 1 28 in. or 30 in., 6 point rip, 1 26 in. 8 point, 1 26 in. 10 point; 1 nest of saws; 1 Atkins coping saw; 1 good saw vise; 1 Morrill's saw set; several different sizes of extra slim taper files; bed rock planes, 1 18 in. or 20 in., 2½ in. blade, smooth bottom fore; 1 14 in., 2¼ in. blade jack; 1 7 in. or 8 in. smoother; 1 4 in. block; 1 round carborundum; 1 oil stone; can of good lubricating oil mixed with coal oil; 1 6 in. sweep, ball-bearing ratchet brace; full set of Irwin double lip auger bits, including sizes No. 4 to No. 20; several small size brace drills; 1 C. E. Jennings expansion bit; full set Keen Kutter chisels; 1 butt chisel; 1 Nichols stiff framing square, bright finish; 1 6 in. Shiveman pat. trisquare; 1 8 in. tee bevel; 1 Yankee spiral screw driver, ordinary size; 1 10 in. or 12 in. stiff driver; 1 Yankee hand drill; 1 Stanley butt gauge; 1 or 2 scratch gauges; 1 Akron level; 1 heavy, 1 light Germantown claw hammers; 1 shingling hatchet; 1 light hand ax; 1 folding draw knife; 1 8 in. divider; 200 ft. chalk line on spool; 1 medium, 1 fine pointed nail sets; 1 brace screw driver; 1 brace counter sink; 1 2 ft. double brass bound rule; 1 5 ft. Master slide rule; ½ doz. Dixon framer pencils; 1 pair automobile pliers; 1 good plumb bob; ⅛ in. Coes monkey wrench; 1 rip chisel; 1 pinch bar; 1 set initial stamps for marking tools; a combination plane like the Stanley No. 45 is a mighty handy tool; a well made and nicely arranged tool chest with a place for every tool, and every tool in its place; and last but not least—a paid up year's subscription to THE NATIONAL BUILDER.

CLEANING BRICKWORK.

From "Jack of All Trades," Newark, N. J.:

"One in Trouble" will get better results on his brick wall by scrubbing his wall with a good stiff steel wire brush, than by any other means. If he wishes to make a handsome finish, he should, after scrubbing, pick out the mortar joints to a depth of about an inch, then have it "tuck-pointed" with a good strong white mortar. This will give a fine finish to the wall but will be a little expensive, as skilled workmen must be employed to do the tuck-pointing. It would be

as well before the pointing is commenced, to wash down the walls with a weak solution of muriatic acid and water, as this will freshen up the brick work, and give it an appearance of newness. If you do not care to go to the expense of tuck-pointing, or scrubbing, the walls may be made to look cleaner and brighter by washing down with soap and water, then after standing a few days to dry, wash it over with a stronger solution of muriatic acid. Use a common whitewash brush to apply the acid solution and keep mixture out of your eyes, for, while it is not dangerous, it may prove unpleasant.



A. J. V., Spokane, Wash., replying to "A Roof Problem," by A. D. Sweetwater, His mistake was made when he increased the pitch on 14 ft. wing. He should have decreased the pitch on the 16 ft. wing. Notice that at X, hip line and valley line are not parallel. That would not be noticeable and I think this the proper solution.

FIRE.

From "New Yorker," New York City:

In answer to "Want to Know," Chicago, Ill., there are several rooms in the Equitable Insurance building that were not destroyed by the fire at the burning of that structure last winter. It is known that one life was lost, and it has been rumored that several others were lost, but I am not in a position to state the facts just now. One room in the building that had been surrounded with a hot fire on all sides but one, and in which portions of the woodwork were charred by the heat, escaped the fire almost intact. Some glass was cracked but did not break through, and a clock on a marble mantel was still going when the room was opened, though some of the outside casing was warped a little. While the building was not considered absolutely fireproof, it was deemed as near to it as any other building in the United States.

CONCRETE FENCE POSTS.

From "Farmer," Middletown, N. Y.:

I would advise "a Mortar Man, Dayton, Ohio," to write to the Department of Agriculture, Washington, D. C., for a copy of the bulletin devoted to the use of concrete for farmers. The department publishes a

fine bulletin—free—on this subject, which you will find of great importance. A little book, published by the Norman W. Henley Publishing Company, 132 Nassau street, New York, entitled "Concrete for the Farm and Shop," will give you all the information on the subject of "Concrete Fence Posts," you will require. The book costs fifty cents, postpaid. There was an article in THE NATIONAL BUILDER, a couple of years or so ago, on this very subject, and if you would look over your back numbers, I think you will find it.

MENDING MEERSCHAUM.

From "W. T. Ince," New York City:

C. N., St. Louis, Mo., will find it a difficult job to make a nice piece of work mending his meerschaum, if it is a pipe. If it is not a pipe, he might use some good pottery cement. If it is a pipe, a different treatment may be required in which cement may not be used at all. Better "knock again" and tell us what the article is.

A WATER TIGHT CELLAR.

From "Wm. Fowler," Toronto, Ont.:

To L. H. Edmonton, Ala. I am supposing you are to excavate for your foundation and cellar, and that the greater portion of your walls will be below the surface level. If so, you ought to experience but little trouble in making a dry cellar, providing the ground where excavated is a fairly dry soil. Lay up your concrete blocks, or stonework, in good clean cement and sand. See that every joint is flushed up solid, and that the connection between the foundation walls and floor of cellar are well knit together while building, with cement mortar. If the ground is wet, and water fills in the excavation, precaution must be taken to prevent the water from getting into the cellar by having the joints well filled with cement, and putting a thick coat of cement mortar on the outside walls and laying a good thick concrete and cement floor in the cellar. Care must be taken all round. Make the cement mortar with 1 part Portland cement, and 3 parts clean sand.

A WATER-TIGHT CELLAR.

From D. E. A. C., Grand Rapids, Mich, answering H. L. Edmonton.

Between the footings and cellar wall lay two or three sheets of asphaltic felt in hot asphalt. The outside of the wall should then be covered by three coats of hot asphalt to grade. The space between the natural ground and the asphalted wall, previously occupied by the forms should be filled with loose gravel to bottom of footings.

Questions

CONCRETE COTTAGES.

From "Inquirer," Atlantic City:

I wish you could see your way clear to publish a few designs of concrete cottages and bungalows? Just now there is quite a number of inquiries here for just such buildings, and I think you can pick out for publishing in your paper, some suited to the wants of the "inquirer." They—the pictures—should show plans rather than elevations, as when a plan is decided upon, the other part can be arranged to suit.

MARBLE WORK.

From J. W., Victoria, B. C.

In your valuable paper some correspondent might be able to give some information on the fitting and setting of marble slabs frequently used in bank work and other public buildings, a line in which I have become much interested recently.

BAKE OVEN.

From "Wilbur Vinear," Dallas, Texas.:

I am in search of information regarding a good sized "bake oven," and will be grateful to the editor, or any reader who will help me in this matter by publishing in this department any information he or they may think will be useful to me. I am going to build this bakery in a town having about 6,000 inhabitants and which is rapidly growing. It is estimated, that within a period of five years, there will be over 25,000 people permanently located in the rising city, and, having the means to do it, I intend to make my bakery up-to-date, and large enough to meet the coming demands?

LEGAL DECISIONS

OF INTEREST TO BUILDERS

Prepared for the
NATIONAL BUILDER
by George H. Murdock

Destruction of work by flood before its delivery by the builder to the owner does not excuse nonperformance of the contract.—Bastrop & Austin, Bayou Rice Growers' Association v. Cochran, 138 S. W. (Tex.) 1188.

A building contractor, not required by the contract to give a bond who, on the demand of the architect gave a bond, may not recover from the owner the premium paid therefor.—Fisher v. Burroughs Adding Machine Co., 132 N. W. (Mich.), 101.

Under the mechanic's lien law, the amount paid by a contractor agreeing to erect a new building for removing an old building on the site was a lienable claim.—Pratt v. Nakdimen, 138 S. W. (Ark.), 974.

One contracting to construct work according to plans and specifications, cannot, in the absence of fraud or mistake, excuse nonperformance on account of defects in the plans and specifications.—Bastrop & Austin Bayou Rice Growers' Association v. Cochran, 138 S. W. (Tex.), 1188.

In every case, except where the title to land is owned by a husband and wife by the entirety, or the land is held and occupied as a homestead, a contract for improvements, whether written or unwritten, express or implied, is sufficient to sustain a mechanic's lien. —Sheldon, Kamm & Co. v. Bremer, 132 N. W. (Mich.), 117.

Under Comp. Laws, Sections 10,710, 10,711 and 10,712, providing for a mechanic's lien on the improvement, and also on the entire interest of such owner, part owner, or lessee in and to the land, if the person contracting for the erection of the building has no legal title to the land, the lien attaches only to the structure erected.—Sheldon, Kamm & Co. v. Bremer, 132 N. W. (Mich.), 117.

If the owner leads a contractor to believe that performance by the time fixed in the contract will not be required, thereby inducing the contractor to expend money and material in completing the work, recovery of compensation cannot be defeated on account of failure to complete on time.—Bastrop & Austin Bayou Rice Growers' Association v. Cochran, 138 S. W. (Tex.), 1188.

In determining for what amount material men were entitled to a lien on the building, it was error to credit the owner as part of the total cost of the building with an amount paid to cover the cost of attached material where the money paid was to be refunded on dissolution of the attachment.—Pratt v. Nakdimen, 138 S. W. (Ark.), 974.

When parties have by contract provided that certain rights shall accrue to or be withheld from them or either of them as between themselves upon the making of a certificate by an architect as a condition precedent, such certificate is conclusive as to the facts so certified, which lie within the scope of the agreement, unless there be proof of fraud in the giving or withholding of such certificate.—Landstra v. Bunn, 80 A. (N. J.), 496.

Where a subcontractor agreed with a construction company to construct tubs for a brewery, the work to be done under the direction and to the satisfaction of the construction company's architect, acting for the purposes of the contract as the agent of the owner, and the contract provided that all payments should be made upon written certificate of the architect that the payment had become due, the contract should be treated as one in which work or material was to be satisfactory to the person acquiring it rather than to a third person designated as arbiter, and a physical production of an architect's certificate is not a prerequisite to recovery, but the good faith of the architect in withholding approval may be inquired into.—Thaler v. Wilhelm Greisser Construction Co., 79 A. (Pa.) 147.

Where the owner of a building forfeited the building contract under a provision thereof permitting him on certificates by the architect to terminate the contract for failure to properly prosecute the work and to complete the work at the builder's cost, the cost of so doing and any damages from the builder's breach of the contract to be certified by the architect, such certificate to be conclusive, the architect's certificates in the absence of any showing of bad faith or collusion with the owner were admissible in evidence in the builder's suit for compensation as against the objection that they were made after plaintiff's work on the building had ceased, and were merely ex parte and unsworn statements.—Taub v. Woodruff, 134 S. W. (Tex.) 750.

Patents

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

1,024,512. Concrete structure stiffener. W. J. Connell and A. F. Dickey, Huntington, W. Va.

1,025,406. Building block. Wm. H. Koenig, Beloit, Wis.

1,025,536. Tile construction for concrete floors. J. S. Nolan, Highland Park, Ill.

1,025,569. Door closing mechanism. O. C. Rixson, New York City.

1,025,330. Wire clip for concrete construction. J. H. Straus, Jr., assor. one-half to R. H. Williams, Baltimore, Md.

1,025,890. Door operating mechanism. C. P. Turner, W. T. Drake and J. E. Little, Steelton, Pa.

1,026,202. Metallic shingle. H. Clawson, Hamilton, Ohio.

1,026,161. Casement window. B. Hausmann, San Francisco, Cal.

1,026,162. Drier for wall boards. H. S. Heichert, assor. Pittsburgh Plate Glass Co., Pittsburgh, Pa.

1,026,398. Balance window sash. H. Knox, Warehouse Point, Conn.

1,026,520. Fireproof window construction. E. H. Lunkenheimer, assor. The Lunkenheimer, Cincinnati, Ohio.

1,025,995. Fireproof window. S. H. Pomeroy, New Rochelle, N. Y.

1,026,471. Ventilator. Geo. R. Siefken, New York City.

1,026,284. Door opener. Benj. F. Souther, Seattle, Wash.

1,026,285. Fire escape. John Stephan, Milwaukee, Wis.

1,027,231. Door operating device. C. Alter, New York City.

1,026,855. Roofing material. C. Ellis, assessor. Ellis-Foster Co., Larchmont, N. Y.

1,027,327. Water-heating furnace. H. C. English, assor. J. W. Carter, Jr.., Wilmington, Del.

1,026,745. Door securing device. R. Heizelman, Belleville, Ill.

1,027,641. Fireproof building construction. C. Collins, Birlingame, Cal.

1,027,821. Breast-wall brick for cupolas. R. P. Cunningham, Holyoke, Mass.

1,027,645. Door hanger. F. W. S. Elstroth, New York City.

1,027,705. Door hanger. F. W. S. Elstroth, New York City.

1,027,407. Brick. Geo. H. Emery, assor. The Des Moines Clay Mfg. Co., Des Moines, Iowa.

1,027,713. Door hanger track. H. L. Ferris, assor. Hunt, Helm, Ferris & Co., Harvard, Ill.

1,027,714. Door hanger. H. L. Ferris assor. Hunt, Helm, Ferris & Co., Harvard, Ill.

1,027,716. Door hinge. Jas. R. Fletcher, assor. The American Hardware Corporation, New Britain, Conn.

1,027,724. Fire escape. E. H. Haney, assor. Haney Fire Apparatus Co., Stockton, Cal.

1,027,766. Roof rafter calculating device. D. Robertson and J. A. Atkinson, New Westminster, British Columbia, Canada.

1,027,935. Machine for making building stones. Wm. A. Todd, Point Pleasant, New Jersey.

1,027,675. Metal window sash. E. R. Viberg, Montreal, Quebec, Canada.

1,027,676. Floor scraper. F. J. Vondracek, Cedar Rapids, Iowa.

1,027,632. Clip for attaching metallic lath. H. E. White, assor. The General Fireproofing Co., Youngstown, Ohio.

1,028,687. Fire escape. V. Denaro, Newton, Conn.

1,028,703. Wooden floor covering. Geo. Fulton, Winnipeg, Manitoba, Canada.

1,028,452. Window fastener. L. W. Gates, assor. C. Cowles & Co., New Haven, Conn.

1,028,453. Fire escape. Jno. B. Glover, Brooklyn, N. Y.

1,028,714. Door track and hanger. Wm. F. Hackney, assor. ½ E. Bennett, Washington, Kansas.

1,028,460. Door check stop. Wm. K. Henry, assor. The American Hardware Corporation, New Britain, Conn.

1,028,725. Roof construction. E. F. Hodgson, Needham, Mass.

1,028,241. Block molding machine. A. McHench, Fargo, N. D.

1,028,294. Collapsible concrete form. W. C. Simpson, Punxsutawney, Pa.

1,028,801. Door strip. L. J. Velentine, assor. one-half D. Hefflefinger and J. E. Lancaster, Plainview, Tex.

1,028,833. Door controlling means. H. G. Voight, New Britain, Conn.

1,028,518. Ventilator. A. G. Wilson, Chicago, Ill.

1,028,171. Window sash operating mechanism. Wm. von Wolffradt, Cleveland, Ohio.

1,029,255. Automatic door operating mech. W. D. Baker, Rogers, Arkansas.

1,029,850. Door check. Wm. H. Aspegren, Quincy, Mass.

1,029,043. Apparatus for molding concrete beams. E. Bianchi, Milan, Italy.

1,029,530. Blocks for building construction. F. Burchartz New York City.

1,028,929. Door lock. Jno. Caldwell, New York City.

1,029,273. Window. D. R. Caler, Beaver, Pa.

1,028,930. Machine for making plaster-board. D. A. Cameron, assor. Delac Plaster Co., Mumford, New York.

1,029,106. Metallic reinforcement for walls. W. L. Collins, Milford, Mass.

1,029,188. Weather-guard for windows. Wm. S. Hamm, H. Woods and A. H. Mewpher, assors. The Adams & Westlake Co., Chicago, Ill.

1,029,381. Window sash. E. H. Lunken, assor. The Lunkenheimer Co., Cincinnati, Ohio.

1,029,151. Portable fire place. C. L. Tavlor, Huntington, W. Va.

Building Material Price List

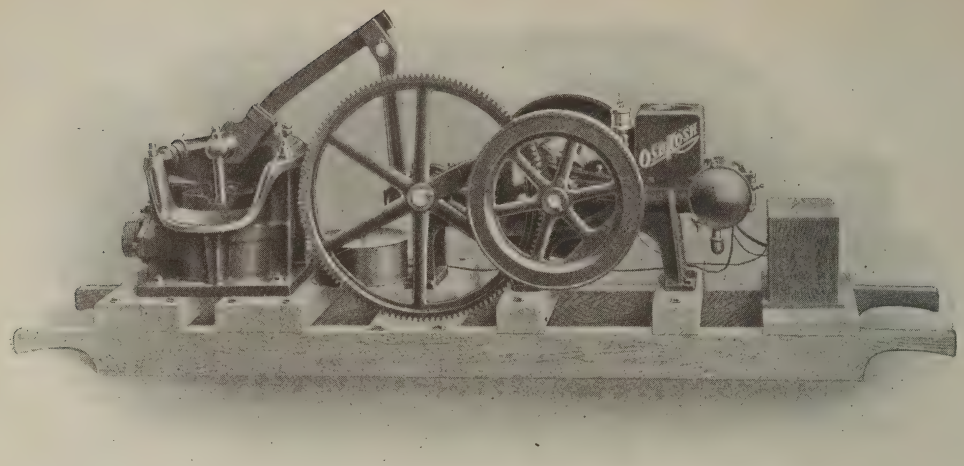
Revised to Date.

*Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red Cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

Dimensions	Seattle, Wash., Corrected by F. T. Bradley. M ft. BM	Chicago, Corrected by J.H. Touchstone. M ft. BM	Omaha, Neb., Corrected by I. P. Hicks.	Southern Ontario, Corrected by F. O. Frantz.
		S 2 S	M ft. BM S 2 S	M ft. BM S 2 S
2"x4" to 8" up to 16', No. 1	$11.00	$20.00	yp $26.00	h $24.00
2"x4" to 8" up to 16', No. 2		18.00	24.00	22.00
2"x4" to 8" 18 and 20', No. 1		21.05	27.00	26.00
2"x10" up to 16', No. 1	12.00	20.50	28.00	24.00
2"x12" up to 16', No. 1		21.50	30.00	25.00
2"x14" up to 16', No. 1	12.50	*	*	26.00
Each 2 ft. over 20 ft., add per M		1.00	1.00	2.00
Select stock as above, add per M	6.00	5.00	*	*
Exterior Finish, Etc.—		M ft. BM D 4 S	M ft. BM D 4 S	M ft. BM D 4 S
1"x3" to 1"x8", No. 1	30.00	yp $32.00	yp $45.00	wp $35.00
1"x16", No. 1	39.00	32.00	43.00	40.00
1"x12", No. 1	35.00	37.00	46.00	42.00
1¼"x3" to 1¼"x12", No. 1		45.00	48.00	45.00
1½" and 2" same as above		42.00	48.00	42.00
1" drop siding, No. 1	25.00	24.00	30.00	30.00
½" lap siding, No. 1 cedar	25.00	*	rdw 30.00	30.00
Enclosing and Fence Boards—		M ft. BM S 1 S	M ft. BM S 1 S	M ft. BM S 1 S
1"x4" to 1"x8", No. 1		yp $23.00	yp $25.00	wp $30.00
1"x8" to 1"x12", No. 1	11.00	23.00	24.00	h 24.00
1"x16", No. 1		*	24.00	24.00
1"x16", No. 2	15.00	*	22.00	22.00
Interior Finish, Flooring, Ceiling, Etc.—		M ft. BM D S	M ft. BM D 4 S	M ft. BM D 4 S
⅛"x⅞", T. & G. Flooring, No. 1	30.00	yp $26.50	yp $38.00	wp $40.00
⅛", T. & G. Flooring, No. 2	27.00	*	34.00	wp 30.00
Ceiling per M	25.00	1.00	2.00	1.00
Partition per M	30.00	2.00	2.00	2.00
⅝"x4" Ceiling No 1	17.00	22.00	30.00	np 30.00
		100 ft. run	100 ft. run	100 ft. run
4¼" Moulded Casing	.02	yp $1.52	yp $2.00	wp $2.00
4¾" Moulded Casing	.02½	1.68	2.50	2.50
7¼" Moulded Base	.03	2.53	3.50	4.50
½"x9¼" Moulded Base		3.75	4.00	6.00
1½"x4½" Moulded Window Stool	.02½	2.12	3.00	4.00
Miscellaneous List—		Per M	Per M	Per M
Shingles, No. 1		rc $3.30	$4.00	bc rc $3.75
Shingles, No. 2		3.35	3.75	*
Shingles, fancy		W. C.	4.50	6.00
Lath, 4 ft., No. 1		yp 3.60	y 5.50	wp 5.00
Lath, 4 ft., No. 2		2.75	5.00	s 3.75
Pickets, 1"x3"x4' 6", dressed		35.00	30.00	*
Pickets, 1"x3"x4' 6", rough		*	*	*
		Piece	Piece	Piece
6"x8' Post split		Cdr $0.13	Cdr $0.25	*
8"x8' Post split		.17	.30	*
8"x8' Post whole		.66	.40	Cdr $0.30
6"x8' Post whole		.25	.35	.25
Hardware List—		Cw.	Cwt.	Cwt.
Nails, wire, common		$2.25	$3.00	$2.85
Nails, cut, common		2.10	*	3.00
Nails, wire, fine finishing		2.65	3.50	4.00
Sash Weights, cast iron		1.60	1.50	2.25
Tarred Felt Paper, best 2-ply		Roll $1.00	Roll $1.00	Roll *
Tarred Felt Paper, 3-ply			1.25	*
Red Rosin, Atlas brand			.90	$0.50
Red Rosin, durable brand			.75	.60
Black Neponset			*	2.50
Masons' Supplies—		Per M	Per M	Per M
Brick, blue, at kilns		*	*	*
Brick, blue, at kilns, No.		*	*	*
Brick, blue, at kilns, No. 2		$7.50	*	
Brick, white, delivered, face		7.00	*	*
Brick, red, delivered, backing		7.00	7.50	*
Brick, delivered, dry pressed		18.00	18.00	$17.00
Brick, vitrified, dry pressed		*	24.00	*
Lime, best gray		bbl. $1.30	bbl. $1.25	bbl. *
Lime, best white		1.40	1.25	1.80
Cement, Portland		.95	1.85	*
Plaster, calcined		2.40	1.80	bbl. $2.50
Hair, 8 lb. per bush		.25	.25	*

NOTE—While these figures are approximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

Trade Review



PORTABLE PUMPS.

The amount of machinery installed in the finished modern building is so great that a deep basement or sometimes a sub-basement is needed to contain it. In such places the excavation frequently develops springs or underground water, or must be carried below the established sewers or adjoining bodies of water.

For the safety of all concerned, this water must be removed at the earliest possible moment, and the wise contractor has on hand facilities for instantly starting to remove it.

The Oshkosh Manufacturing Co., 414 S. Main St., Oshkosh, Wis., manufacture a complete line of portable diaphragm and centrifugal pumping outfits driven by gasoline engines or electric motors. These pumps are designed to do away with expensive hand pumping and are so designed and mounted that they are immediately available for use either on the street or in the deepest excavation.

One of the styles of diaphragm pumps, equipped with a four-cycle gasoline engine, is shown on this page. This style, known as Type E, has proven extremely popular among the contractors who have used it, as it can be started at a moment's notice, needs no attention, never gets tired, and will run all day at an expense of less than twenty-five cents. This style is made in two sizes weighing 440 and 540 pounds and having an hourly capacity of 3,600 and 7,200 gallons capacity, respectively.

The Oshkosh Mfg. Co. have prepared a neat circular showing these pumps in detail, as well as their various styles, capacities, weights, etc. This circular is sent free on request and every contractor should have it in order to be posted on the pumping subject whenever such a proposition arises.

"RED DEVIL" TOOLS.

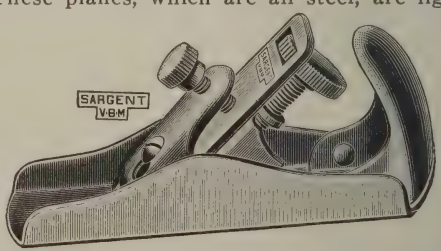
The sixth edition of the Green Book of Hardware Specialties and "Red Devil" tools, issued by the Smith & Hemenway Co., Chambers St., New York, is beautifully illustrated in three colors and shows the great variety of tools manufactured by this progressive concern.

This catalogue is issued in loose leaf form so that obsolete pages can be omitted and new pages added from time to time. It shows the latest styles in "Red Devil" chain drills, and the application for various classes of work, also for pliers, fence tools, cutters, wire clamps, grips, etc. For electricians' use there are also screw drivers, spark plugs, climbers and shears. Machinists will be interested in shears and saws, and the carpenter will find a large list of standard and special tools adapted to his use. We are advised that this catalogue will be sent to our readers on request, and at the same time their names will be kept on file for future sheets to be added to the catalogue.

TWO NEW PLANES.

Two new types of planes which will be appreciated by all mechanics, as well as manual-training instructors and other workers in wood, have been placed on the market by Sargent & Co.

These planes, which are all steel, are light.



unbreakable and indestructible; owing to their shape and size they may be readily carried in the pocket of a carpenter's apron; they are particularly desirable for use in work on scaffolding, etc. Mechanics will find them substantial, serviceable and handy; they are also

You Can Get a Hand Saw for 75c

OR

You Can Get One for $2.50

Take your choice. The one is only a Hand Saw. The other is a SIMONDS Hand Saw

Now, there is the difference. One is an unknown brand made to sell. The "Simonds" is the known brand, made to establish and keep a reputation for quality goods.

The buyer of the cheap saw takes all the risk. The buyer of the Simonds $2.50 Saw takes none of the risk. Every Simonds saw is fully warranted and any defects whatever, which by possible chance should get by our inspection, are covered by a guarantee which enables the carpenter to take the Saw back to any Simonds Saw Dealer and get his money refunded.

One of the latest and in fact the most finished article in the line of Hand Saws that has been put out is the **Simonds Blue Ribbon Hand Saw,** made of Simonds Steel, highly polished, accurately ground, and carefully tapered. A blade that will stand continual use for years; will hold its cutting edge. The handle is highly polished apple-wood, and it is an article of beauty as well as usefulness.

This saw, 26″ length, sells for $2.50. It is new. It has not yet been placed in many of the Dealers' stores. The chances are that your dealer does not yet carry this Saw, but, if you would like to see one, have him get it for you. You may be sure you need not take the Saw unless absolutely satisfactory.

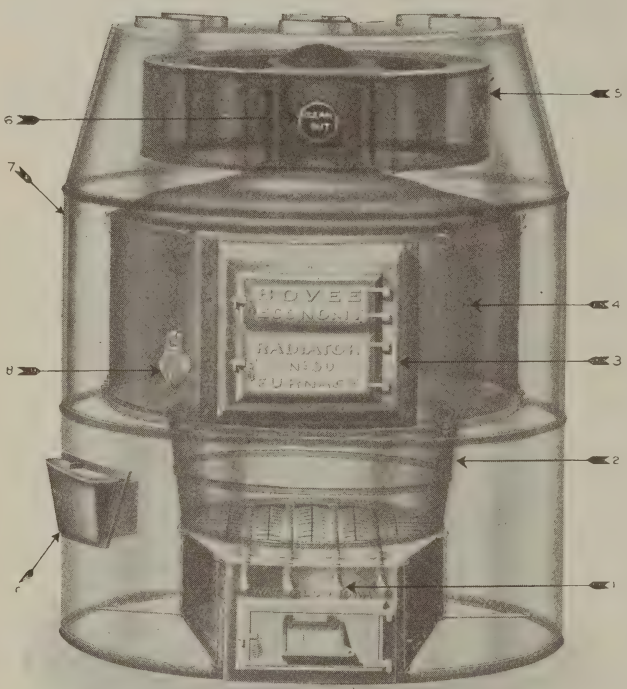
Simonds Manufacturing Company

Fitchburg, Mass.	Vancouver, B. C.	San Francisco, Cal.	Seattle, Wash.
New York City	Chicago, Ill.	Lockport, N. Y.	London, Eng.
Portland, Ore.	New Orleans, La.	Montreal, Que.	St. John, N. B.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Bovee's Furnaces at

Ours Are The Only Furnaces Having A Perfect Ventilating System—



Besides the following Strong Points:

1—The independent Rocker Shaking Grates, easy to operate, never clogs with cinders and in mild weather it is only necessary to shake one or two, allowing the ashes to remain on the others, giving the same effect as a small firepot that would only hold a hod of coal. With these grates the fuel burning capacity can be regulated exactly to suit.

2—Heavy castiron Firepots, made in two sections—the most durable and largest radiating capacity in use.

3—The large Double Doors—only one or both can be opened as desired.

4—The large Combustion Chamber, almost a foot larger than the firepots. It is the **combustion chamber** that **radiates the heat** and the **firepo** that **burns the fuel,** and the larger the combustion in proportion to the firepot, the less fuel will be consumed to produce a given amount of heat.

5—The Compound Circulating Radiator—The heat enters this radiator at the center and circulates around both ways before entering the smoke flue, giving a travel to the heat, and securing the utmost amount of heat from the fuel consumed.

6—Clean Out—This clean out opening extends through the casing and through it the circulatory radiator can be cleaned in two minutes, without stopping fire. This allows the radiating surface to be kept as clean of soot as when new.

7—Large Galvanized Iron Casing, made double and having asbestos between. With this large casing the air never becomes overheated and is balmy as June.

8—Hot Blast Ventilating System gives fresh air to every room, burns the smoke and gives a quick, healthy circulation to all the air in the building.

9—Water Evaporation Pan supplies moisture to every room in the house; an advantage that cannot be secured by a steam or hot water plant.

PLANS AND SPECIFICATIONS Send us a rough floor plan of the building you wish to heat and our experienced experts will prepare free of charge a complete plan of your heating plant and give you our manufacturers' prices, which are but little above the actual cost of production in our own factory by the best improved methods.

SHIP CUT TO FIT—EASY TO INSTALL. We ship everything prepared, and any handy man can install our furnaces perfectly. We furnish full directions and illustrations for installing.

FIVE-YEAR GUARANTEE. We use the best material and furnish a five-year guarantee. There is absolutely no risk in buying a Bovee Furnace.

Send for Free Catalogue and All Desired Information

Bovee Grinder & Furnace Works,

N.B. PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Manufacturers' Prices

The Bovee Furnace, made of the best material and workmanship, and in every respect a first-class, high grade heating plant—THE BEST that can be secured at any price.

WE make the combustion chamber, the return circulating radiator and every part of the ECONOMY FURNACE very large in comparison to the firepot. This makes them the most durable and economical of any furnace in use and causes them to supply a perfect, balmy air, similar to May or June. This very large combustion chamber, perfect combustion in burning wood, coke or any kind of coal, the long travel of the heat before reaching the chimney, causes these furnaces to actually require only about ONE-HALF OF THE FUEL USED BY OTHER FURNACES.

Don't compare our prices with small, cheap furnaces that do not have one-half the capacity. Measure the firepot, measure the combustion chamber, measure the compound circulating radiator. Note the long travel of heat before reaching smoke pipe. See why the Bovee Furnaces LAST LONGER, USE LESS FUEL and COST LESS in comparison with other furnaces of equal size and capacity.

Prices of Our Economy Furnaces F. O. B. Waterloo

No.	Dia. of casing	Dia. of radiator	Dia. of firepot	Heating capacity up to	Price complete with casing
40	40	28	21	five rooms	$53.00
45	45	32	23	seven rooms	58.00
50	50	34	25	nine rooms	63.00
55	54	38	29	eleven rooms	68.00

Larger furnaces at equally low prices.

Eureka, Kansas.
As to the use and well testing of my furnace for the past severe winter, I am very much pleased to write that it has given me most satisfactory results in every way.
B. M. CANNING.

Harlin, Iowa.
In regard to the furnace I bought from you, will say that it works to my entire satisfaction. During the past winter I have had no trouble to heat all of my house, although it has been 37 to 39 below. I can certainly recommend it to any one wishing a hot air furnace.
H. C. CHRISTIANSEN.

Washburn, Wisconsin.
Regarding furnace, I must tell you that words are hardly enough for it. That furnace cannot be compared with any other. We had a very severe winter this year, but in our house we hardly noticed it, so comfortable we were.
MRS. H. C. FAHRIG.

Huntsville, Ohio.
The furnace we bought of you gave us excellent service during the extreme cold of last winter. We are very well pleased with it. I think your furnace is equal to the best, regardless of price.
J. B. FORSYTH.

Store Building

Fulton, Ind.
Your furnace has done all you claimed, and as we have passed through a very severe winter, it has made our stores very comfortable and has been properly named "Economy."
M. O. ENYART.

Hamburg, Wisconsin.
I am very well satisfied with my furnace. Had no trouble to set it up and recieve all the heat I need.
FRANK KYSOW.

Halls, Tennessee.
Your furnace which we have installed in our house has given very satisfactory service and we are very well pleased with it. It is a fuel saver.
C. B. ROOKS.

Charlotte, Michigan.
The Bovee Furnace I purchased of you last fall is giving the very best of satisfaction, and is, in my judgment superior to any hot air furnace manufactured. We have just passed through the coldest winter Michigan has ever known, the thermometer registered as low as 36 degrees below zero, and the cold being continued most of the winter. Your plant cannot be recommended too highly.
FRED. A. FAIRCHILDS.

Waubay, South Dakota.
Having used your Horizontal Radiator Furnace for two years, I am well pleased with it. I am burning soft coal during the winter and in the fall and spring I burn all kinds of rubbish and find it all right in every respect.
NIELS F. PEDERSON.

Swedish Lutheran Salem Church

Phestigo, Wisconsin.
The furnace of your make that was placed in our church has given excellent service and never, even in the coldest weather, failed to evenly fill the auditorium with a pure and pleasant air. You remember that the size was considered rather small for the size of the auditorium, but it does the work admirably. We are all pleased with it.
FRANS E. SARD.

Send for Free Catalogue and All Desired Information.

You will like the BOVEE FURNACES just as well as our thousands of other customers

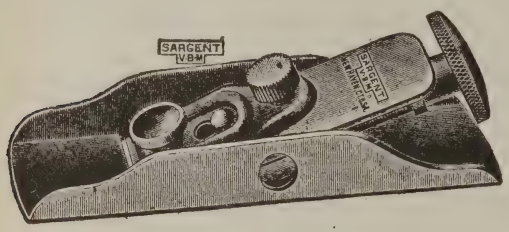
60-Eighth Street, Waterloo, Iowa

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

particularly suitable for amateur work at home. The Sargent V. B. M. stamp is an indication of their high grade and superior quality.

The pocket plane (No. 2204) is 4¼ inches long and has a 1⅜-inch cutter. Pattern makers will find it particularly useful. It is furnished in the highly polished finish.

The low-angle block plane can be obtained both highly polished (No. 4206) and nickel



plated (No. 5206). It is 6 inches in length and the cutter is 1⅝ inches wide.

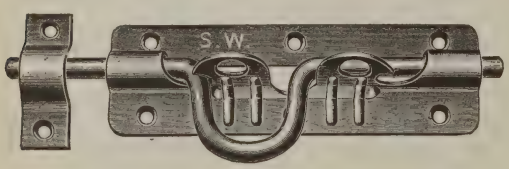
The clamp of both planes is especially powerful, owing to the screw construction which takes the place of the cam generally used on the Block Planes. This is indicated by the fact that it is necessary to loosen the clamp screw before making the lateral or up and down adjustment.

The adjustments are quickly and easily made, the side adjustment by moving the cutter with the fingers and the up and down adjustment by the screw in the rear. On Nos. 4206 and 5206 the head of this screw is made so as to serve as a handle.

Sargent & Co., also manufacture a complete line of planes and other carpenters' tools listed in the Sargent Tool Book, which will be sent free by addressing them at 1151 Leonard St., New York.

THE DICKEY BOLT.

One of the latest productions of the Stanley Works is the No. 1070 "Dickey" Bolt. It is an automatic door bolt with a variety of uses; in fact, it can be used in practically every position possible for a bolt. It is equally useful on the outside or inside of a door, on the right hand or left hand side, at the top or bottom. On the outside a padlock is used to lock



the bolt, by passing the lock bar through the loop of the bolt and the hole in the plate. On the inside the bolt, as it is shot into place, locks itself automatically.

These bolts are made of best quality wrought steel. The design is simple but very strong, the plate reinforced by corrugations. Japanned, plain steel and Sherardized finishes can be furnished.

The simplicity of the "Dickey" bolt, its many uses and unique characteristics make it a profitable, easy selling line for every hardware dealer.

The Stanley Works, New Britain, Conn., also manufacture a complete list of hardware for general building purposes and will be glad to send their general catalogue or special circulars to the contractors, builders, etc., who ask for it.

THE PERFECT BRICK MACHINE.

The use of cement brick has received far more consideration in foreign countries than in the United States, due to several reasons. The large amount of lumber available has caused many home builders to use that as their principal material. The immense deposits of brick making clay has developed the clay-brick industry to a high point of efficiency. The high cost of foreign cement has prevented many from using it.

Today, however, conditions are changing so that cement and brick are in many places the cheapest form of construction which can be used. The rapidly disappearing forests have raised the price of lumber; labor conditions have increased the price of brick, while the ingenuity of the American cement manufacturers has lowered the price of that commodity until it is within the reach of every contractor, builder and home owner.

There are advantages in concrete construction. By its use a fireproof building is obtained which will neither need paint nor repairs for many years, the maintenance cost being thus kept very low.

There have been many machines and systems designed for using concrete as a building material. For different locations and conditions, each of these had merits. For the ordinary builder engaged in erecting the smaller classes of buildings, such as residences, small stores, factories and isolated structures, no form of concrete construction possesses more advantages than that of concrete brick, made in the same sizes as the commercial brick used in that neighborhood.

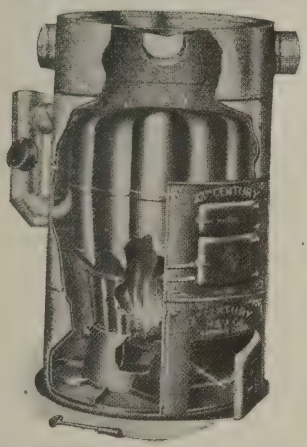
It is obvious that to work to advantage with this size material that the manufacturer must be possessed of machinery which will manufacture them in large quantities. C. S. Wert, 602 North Main street, Kendallville, Ind., foreseeing the demand for material of this character, constructed a machine which would make these brick rapidly and economically. The machine will mold as high as ten brick at one time, and different faces can be obtained by the use of various molds.

The machine is complete in itself and is so simple in operation that one man can operate it. The quality of the product is such as will pass inspection by the most critical.

The circular which Mr. Wert is sending out to readers of THE NATIONAL BUILDER shows in detail the construction of this machine, its operation, and a number of the buildings which have been erected from brick made with it. This circular is sent free on request.

Equipment of the Kind that Makes the Builder's Reputation

XXth Century Heating Apparatus



Hard or Soft Coal Warm Air Heaters

Steam and Hot Water Boilers

Every Builder realizes that the efficiency of the heating apparatus in the house is not the least of the things by which the house will be judged—and therefore he wants the very best possible, consistent with cost of installation, maintenance and operation.

XXth Century Heaters and Boilers fill that bill. Among other features, the Fire Box (our exclusive patent) guarantees absolute combustion and ease of operation—it permits the very cheapest grades of soft coal and screenings to be burned as cleanly, easily and with as good heating results as higher priced fuels in other apparatus.

You will be interested in our catalog, and a glance over our price list will show you additional reasons why you should specify XXTH CENTURY HEATERS AND BOILERS. Write us.

The XXth Century Heating & Ventilating Co., Akron, O.

BUY FROM THE MAKER

¶ We have made and sold thousands of steel furnaces in Chicago, and we have sold them everywhere, by mail, direct to contractors, builders, and house owners, all over the country, from Maine to China. We don't offer them through dealers, for the DIRECT DEAL with the consumer is the most satisfactory to all concerned. It means BETTER SERVICE—because of the direct interest of the maker in each contract—and it means BETTER PRICES, for the middlemen's profits are cut out.

¶ **In buying** the Hess Furnace, **you needn't have faith.** You can buy it now, on trial, and test it before January 1st, 1913. We will deliver it at your station, with all pipes and registers—freight prepaid.

¶ **Set it up and use it.** If you're not pleased; not sure you have big value for the price—send it back to us—we paying return charges—and we won't claim one cent from you.

¶ **We don't offer you credit, however,** for we require the price to be deposited with your local banker when you receive the goods. He holds it till the test is made, subject to the conditions outlined above, and gives it to you or to us, according to the result of the test. You take no risk, and you will save money.

¶ **Our furnace is made of steel,** EVERY SEAM WELDED, and therefore permanently gas—dust—and smoke—tight. Made in six sizes, and burns any fuel. There is no furnace better, at any price.

¶ Our 48 page booklet on furnace heating is free. Ask for one. It will give you a lot of useful information on heating.

HESS WARMING AND VENTILATING CO.

907 TACOMA BUILDING, CHICAGO

WE MAKE THOSE BEAUTIFUL WHITE STEEL MEDICINE CABINETS; CHEAPER THAN WOOD

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

READY ROOFING.

Abner Serrill Loses an Old Customer Selling a Poor Grade Roofing to Farmer Blythe, Turns Out Costly to Both.

"Mornin', Abner," shouted Farmer Blythe, as he bustled into Abner Serrill's general store.

"Want a roll of chicken wire, some staples, four pound o' 10-penny nails, and three rolls of roofin'. Got to patch the barn up again. 'Pears to me it's nothing but patch it up all the time."

"What kind o' roofin' will ye have, Silas?" said Abner. "I've got three or four kinds. Here's a lot I kin let ye have cheap. Got it at a special price like. If you want it I'll sell it to ye ten cents cheaper."

The three rolls were purchased and the next day Farmer Blythe put in the entire morning laying it.

"Got to make her good and tight by harvest time," he said. "Can't afford to have any leaky roofs mildewing my hay and startin' any of these here spontaneous combustion fires, like Jeff Johnson's, next month two year ago.

"Funny thing how wet hay will get all het up and burst into flame. Certainly is."

The harvest was one of the best Silas Blythe had in years. The spacious barn was packed to the doors with the fruits of the field and the hay-loft was filled with tons of sweet-smelling hay.

The first week of October came in rainy. It rained for three days without let-up. Then Farmer Blythe discovered something. His roof leaked. An examination outside showed that the bargain lot of roofing had blistered and split so that it let the water in like a sieve. The pitch that had been in it was caked in little lumps on the outside.

"That's the dearest roofing I ever bought," said Farmer Blythe. "It'll jest cost me three days' time to take that hay out and dry it."

The next day Silas Blythe went into the village. He drove stiffly past Abner Serrill's general store to the next block, where he stopped in front of a new store opened up several months back by an enterprising young fellow who seemed to be getting some of Abner's trade.

"Morning, young man," said Silas. "I want a roofing that won't leak, and I want the best kind you've got in the house. I don't want no bargain roofing, neither."

The young dealer smiled. He had had three similar complaints within the week from three of Abner Serrill's former customers.

"I have only one kind of ready roofing, Mr. Blythe," said the young dealer, "the kind that has been proven for its endurance—Genasco, the Trinidad-Lake-Asphalt Roofing. It doesn't cost any more than any other good roofing, and only a few cents more than inferior grades, but it will be the cheapest in the long run, because you won't have to repair it every year.

"Cheap roofing, on which I might possibly make more profit than I do on Genasco, does not tempt me to sell it. I would lose more in the end, because my customers wouldn't come back to me again."

"That's the kind of talk I like to hear, young man," said Farmer Blythe. "How is this Genasco Roofing better than t' other kind?"

"Well," said the dealer, "it's made from natural asphalt from the Trinidad Asphalt Lake, which is Nature's everlasting waterproofer. Genasco is not affected by the sun, and it will not crack and break in the coldest weather. Its natural oils make it waterproof, and crack-proof. It is also spark-proof; and that will get you a lower insurance rate. It—"

"Hold on, young man, I believe you have told me enough already. Jest load me up a dozen rolls. I'll put it on all my buildings."

IDEAL CONCRETE MACHINERY.

Catalogue No. 25 of the Ideal Concrete Machinery Co., South Bend, Indiana, contains, besides the descriptions of their various styles and machinery, a great deal of original information on concrete block construction. There are numerous illustrations of beautiful buildings, residences, club houses, factory plants, etc., in which material manufactured by their machines have been used.

There is also included standard specifications for hollow concrete building blocks as adapted by several of the large cities.

We understand that the mention of the National Builder will secure this beautiful catalogue free of cost.

AMERICAN SEAL PAINTS.

The William Connors Paint Manufacturing Company, Troy, N. Y., has prepared a very elaborate circular showing the various tints in which American Seal Ready Mixed House Paints are prepared. The circular also shows the method of selecting proper colors for harmony and gives directions for ascertaining the amount of paint required and how to apply the various coats to secure permanent and effective results. The evils to be avoided in painting are carefully considered and should one follow their directions carefully, satisfactory results should follow.

The William Connors Paint Manufacturing Company make a complete line of oil paints for wood and similar construction and also have a number of cement coatings, composed of specially prepared materials, which they recommend for use on cement, brick, stone and concrete surfaces subjected to severe conditions and to the destructive elements. These coatings are in such a variety of colors that a combination of the various ones will make practically any desired shade.

For some purposes the ordinary paints are not to be recommended. For roof painting and indestructible coat of elastic paints is required, which shall be unaffected by heat or cold; for cold storage a non-corrosive, anti-rust paint must be used to protect the condenser and refrigerator pipes; and for barns and fences, a cheap, durable paint is required.

It is not enough, therefore, to merely specify paint. The purpose for which it is in-

Residence of A. C. Maguire, Winnetka, Ill.
Spencer & Powers, Architects.
NEPONSET Red Waterproof Building Paper Used.

Exposure — Dampness — Rain, Itself, Has No Effect on

NEPONSET WATERPROOF Building Papers

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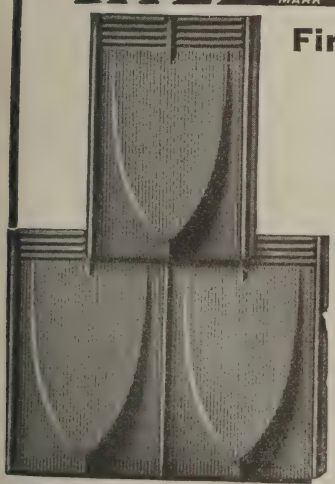

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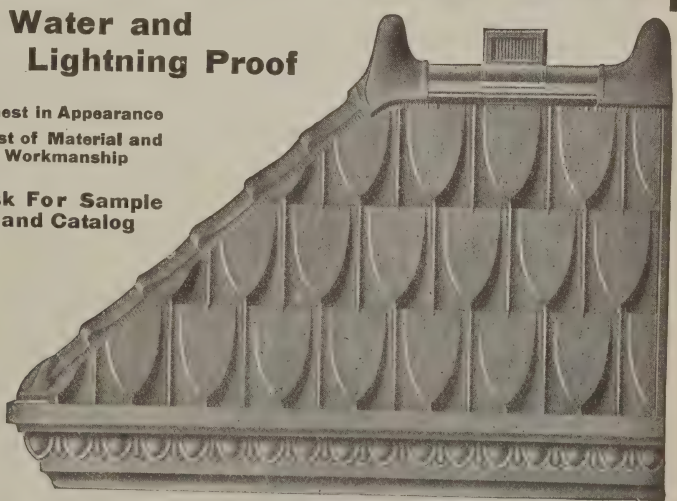

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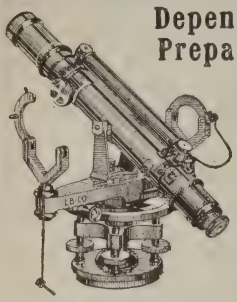

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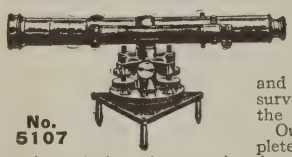

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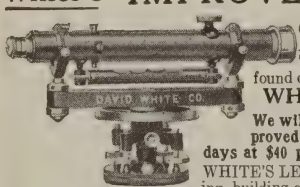

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The heat producing power of a furnace depends upon the area of its prime heating surface and its economic principles of combustion. A perfect combustion means a well-balanced mixing of the oxygen from the air with the burning materials, and unless the amount of oxygen is carefully proportioned to the fuel, there is a loss of heat energy. Too many furnaces are built without due regard for a carefully measured oxygen feed. The value of this principle is well illustrated in the perfection of the Wellsbach and other modern lighting systems, which have developed the lights so superior to the old oil lights and tallow dips.

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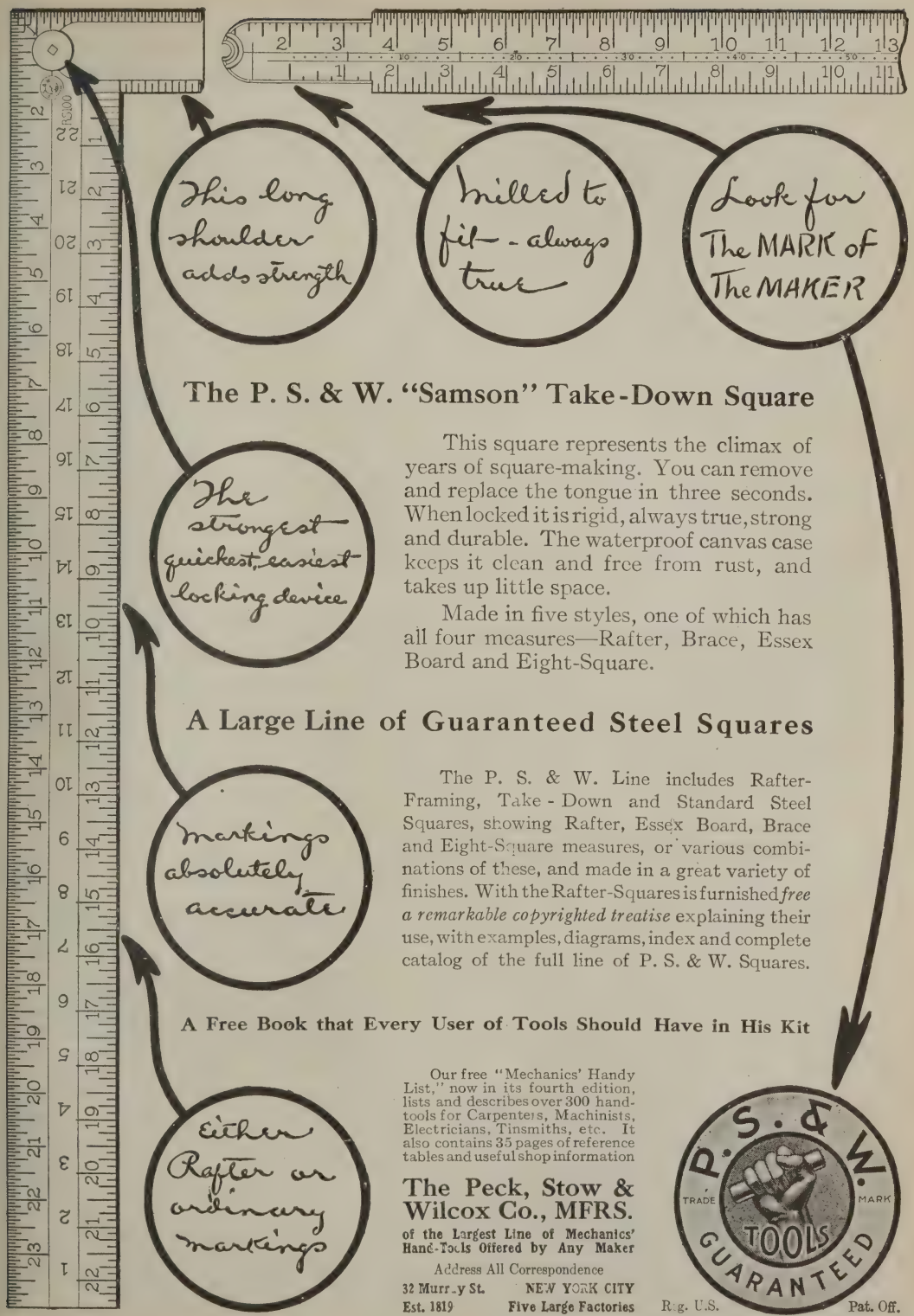
The Twentieth Century Heating & Ventilating Company take great pride in both their plant and their product. The continually increasing sales, both in their home town and abroad, leads them to believe that the tested merits are becoming better known every year. The catalogue No. 16 of the Twentieth Century Heating & Ventilating Company will be sent to those who are interested in learning the latest in the selection, installation, operation and maintenance of up-to-date furnaces.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NAT. BUILDER

THE BIRN CONCRETE BLOCK PRESS.

For centuries the use of natural stone has been given the highest place in the construction of buildings both by architects and builders, yet many natural stones have inherent faults, some of which show themselves early and others only appear with the lapse of time. Stones of sedimentary origin, unless carefully laid on their natural beds, will flake off and become greatly weakened; other stones, especially the granites, are particularly susceptible to fire a comparatively slight heat ruining the largest blocks.

The difficulty of procuring blocks of suitable size of various stones led to the introduction of burnt clay products, such as tile and terra-cotta, but these, too, have their limitations in cost and availability.

The introduction of American Portland Cement has led to the commercial use of concrete in many forms, no one of which is of greater value than that of concrete blocks. The blocks, as made by the best machines, are really artificial stone, being composed of the same materials and having the same chemical and structural composition.

A great many machines have been designed for the manufacture of blocks; most of these are mere forms in which the block is tamped, the machine merely facilitating the process of manufacture.

In the Birn Concrete Block Press a rather different system is employed. The block as patented is of an "L" shape, with the broad face exposed to the weather.

This face is on the top when in the machine and great pressure is brought to bear upon it so that the material is compressed into a firm homogeneous block, non-porous and permanent.

The Birn Concrete Block Press is manufactured by the Northwestern Steel & Iron Works, 1089 Spring street, Eau Claire, Wis. In the catalogue which they are sending out are many interesting ideas to the block manufacturer. The catalogue shows in great detail the method of making block and laying them in the wall to produce the best results. This catalogue is of interest to every concrete worker.

SURVIVO ORNAMENTAL ROOFING AND SIDING.

The various conditions under which roofing is used in different sections of the country is responsible for a wide variety of roofing materials. Certain sections are especially fortunate in having slate quarries near their doors and at such the prevailing roofing is slate. Throughout the country, the story is the same —the nearness to the source of supply frequently regulating the roofing most in evidence.

But there are many places in which the older forms of roofing are not so readily obtained. In such places the contractor, builder and owner must determine which form of roofing he will import for his use. The various qualities of the different materials are investigated and attention is paid to slate, shingles, tin, tile and so-called ready roofing; the latter is found to consist of a number of brands of somewhat similar, yet dissimilar, construction. One of the most popular brands on the market today is that made by the Huber Builders Material Company, 3943 Vine street, Cincinnati, O., and is known as Survivo Ornamental Roofing and Siding. This roofing is made in a number of different finishes, the general construction being a wool felt saturated with pure asphalt and surfaced with various crushed materials, such as natural slate, granite, silex, flint and fine gravel.

Survivo comes in rolls which have been cut in various patterns to produce diamond, mitred or square shingle effects. By the use of this roofing, the decorative effect and markings of tile, slate, or shingles is obtained without the disadvantages of their high cost, cracking, splitting and warping. The colors being natural, there is no tendency to fade, and on account of the extremely durable nature of the materials used in its manufacture, the makers guarantee this roofing to last fifteen years.

A recent circular from the Huber Builders Material Company shows the method of laying this style of roofing and the effects obtained by its use. We understand that any contractor or builder can obtain this circular free of cost.

THE CONRAD SAW TOOL.

The user of circular saws knows how rapidly they get out of condition. The constant use in even soft woods dulls the edge, while a few moments' work in hard wood will sometimes heat up the saw so that it is useless. Carelessness is responsible for considerable damaging and the ever possibility of striking a nail adds to the filer's troubles.

The Conrad Saw Tool, manufactured by H. G. Conrad, 709 South Clinton street, Chicago, Ill., is designed to take a large part of the work of caring for a circular saw off the hands

of the filer. By the use of a tool of this character, the small shop or planing mill is independent of the expensive saw filer, as a few minutes' work will restore the saw to perfect condition. As will be seen from the cut, this saw is adjustable for different sizes and for sharpening at the proper angles; an attachment is also provided for gumming and setting.

The Conrad Saw Tool takes up a very small space in the shop and if desired can be moved from place to place. A circular fully describing the Conrad Saw Tool will be sent to every user of a circular saw.

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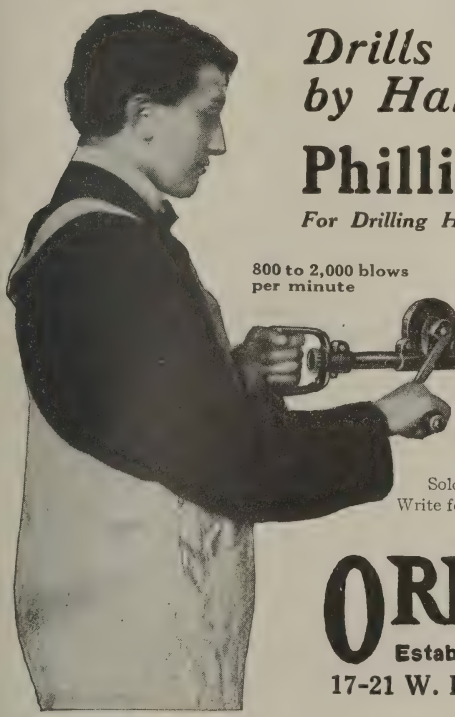

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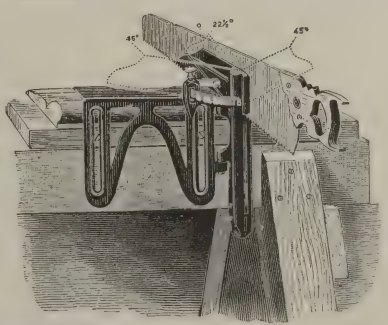

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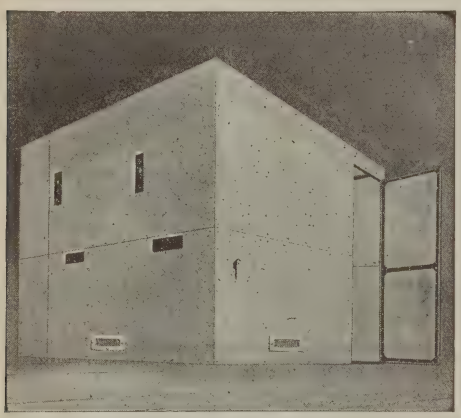
THE SAFEGUARDING OF MOVING PICTURE SHOWS.

By W. H. Radcliffe.

There are in this country, according to statistics recently compiled, over $100,000,000 invested in the moving picture business. This investment is divided among 16,000 theaters, which give regular performances, and a large number of halls, churches and clubs, where the moving pictures are displayed only occasionally.

Considering the amount of money thus invested, the 15,000,000 people who, it is estimated, attend these performances daily, and the inflammable nature of the celluloid films which are in constant danger of being ignited



Permanent Booth.

by the intense heat of the projecting lamp, the matter of using a proper form of fireproof booth to enclose the operating apparatus is of importance to the owners as well as the patronizers of these moving picture establishments.

A burning film is practically unquenchable by water or by any known chemicals, and the fire is self-supporting and spreads with great rapidity, generating an intense heat and dense, noxious fumes and smoke. In consequence, when a film becomes ignited it often results in a fire destructive to both life and property.

To prevent such a catastrophe a new ordinance went into effect in New York State July 24, 1911, which requires every moving picture theater booth to be built of asbestos board supported upon an iron framework.

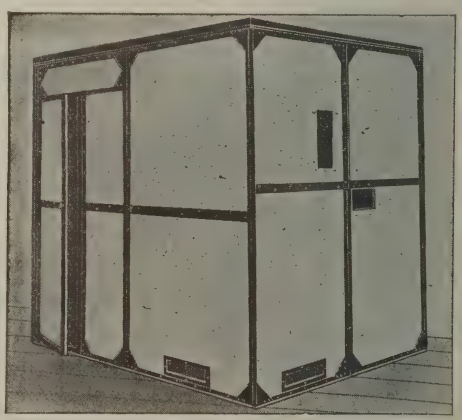
Massachusetts, Maine, Connecticut, New Hampshire, Vermont, Rhode Island, Pennsylvania and New York, besides the National Board of Fire Insurance Underwriters and the New England Insurance Exchange, have approved the use of this asbestos booth construction, both in the permanent form shown in Figure 1 and in the semi-portable form shown in Figure 2.

The J-M Transite Asbestos Wood, of which these booths are made, is mineral in character, being composed of asbestos fiber and binding cements. It is therefore absolutely fireproof and hard, but otherwise has the same physical characteristics as ordinary wood. Nails can be driven into it with the same ease as in oak or maple, screws holds much better, and it readily takes paint or varnish and can be beautifully polished and grained.

With the object of determining the breaking strength of J-M Transite Asbestos Wood after being subjected to burning temperatures, Prof. C. L. Norton, of the Massachusetts Institute of Technology, recently conducted a test on specimens 12 inches square and about ¼ inch thick. These specimens were gradually raised in temperature to 1,700 degrees Fahrenheit, reaching this point in 20 minutes. During the following 10 minutes they are kept above 1,700 degrees Fahrenheit, and then soaked in water.

The specimens were then supported at the center 11 inches apart, and broken by a central load. The average breaking strength of the heated specimens was 141 pounds, whereas the average breaking strength of unheated specimens was 257 pounds center load, 12 inches. This is a very favorable comparison, showing that the heated specimens lost but comparatively little of their breaking strength.

Referring to the permanent form of moving picture booth, shown in Figure 1, the framework is made of heavy angle irons or tees, to which the J-M Transite Asbestos Wood sheets



Semi-Portable Booth.

are bolted. The side and top sheets are ¼ inch thick, strong, and free from warping and shrinking; the floor sheets are ⅜ inch thick, and of the same material.

The semi-portable form of moving picture booth, shown in Figure 2, fulfills the requirements for a permanent booth of the portable type. It can be put together or taken down in less than two hours. Ordinarily, it takes two men from one to two days to build up the permanent form of booth, so that the advantage of the semi-portable form for any location is perfectly obvious.

The booths shown in this article were made by the H. W. Johns-Manville Co., New York City, to whom the author is indebted for the illustrations.

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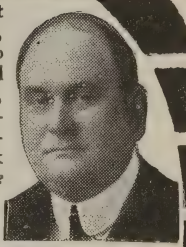

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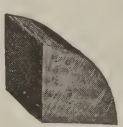

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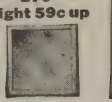

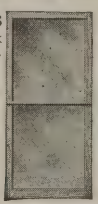

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THE ART OF MAKING STEEL CEILINGS.

To keep pace with the progress of the times in beautiful and distinctive architecture and interior decorations, the manufacturers of steel ceilings are making giant strides that are aiding materially in securing the magnificent effects in hotels, apartment houses, public buildings, dwellings and other structures of various kinds.

The manufacture of steel ceilings is most interesting and a trip through the plant of the Berger Manufacturing Company of Canton, O., is productive of much that is new and instructive. There can be seen the entire process that transforms the raw material into the artistic panels, scrolls and patterns of wonderful design, which, when properly assembled, make ceilings that are better in every way than the old form of plaster or wood.

Ceiling in Berger's New York Office.

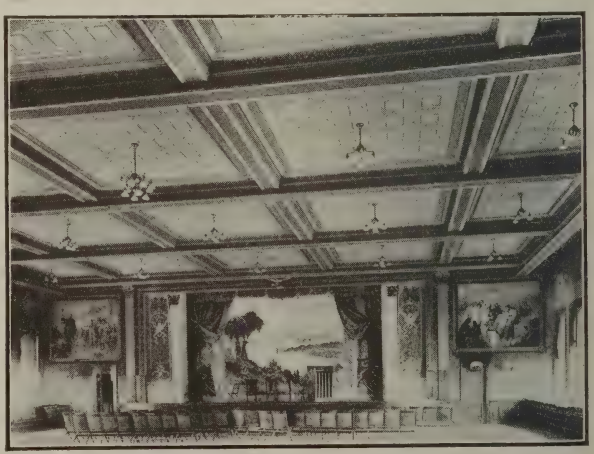
In the manufacture of steel ceilings the quality of the steel used is a very important item and yet it is one which is frequently overlooked by the purchaser. If the steel is brittle or unmalleable the fibers become strained or ruptured when subject to the force and pressure necessary to produce the clear cut impressions that are essential to classic effects. The rupture of the steel fibers in stamping means that the ceiling will be cracked and broken and both its beauty and usefulness marred.

The Berger company's many years of experience in steel ceiling manufacture and their constant experimenting during that time to secure a perfectly pliable steel, have enabled them to turn out deeply embossed ceilings free from fracture. This result can be secured only by the use of the best quality of steel, and by care and skill in working it.

The best steel sheets being used as the basic material for the ceilings, it is natural that the highest grade paint and most effective painting systems are employed. The Berger ceiling plates are primed with a paint mixture of a light gray color, inclined to a white, called ceilcoat. The mixture, as to ingredients, is the exclusive property of this company and because of the grade of paint used and its manner of application, there are no such defects as streaky priming.

The painting of the ceiling sheets—that is, factory prime coating—is done by the roll and brush painting process All sheets are painted in the flat before being stamped to design.

The materials being high grade, the designing and other departments through which the sheet steel passes in its transformation from raw product to finished steel ceilings, maintain a similar standard of workmanship and thoroughness. Design is the base of steel ceiling formation, developed by the modeling artist on certain defined architectural lines to conform to the class intent and meet the contentive factors during process of manufacture. In designing a ceiling, the modeling artist's first step is to sketch roughly with charcoal on full size detail paper the figurative outlines he proposes to follow in the formation of the design. The sketch is transferred to a slab of damp modeling clay, which is nothing more than ordinary brick-making clay moistened with enough glycerine to give it the consistency and tenacity of stiff putty. In this clay the artist moulds and models his design with great care and accuracy. The entire design is cut into the clay, every figure, line or scroll worked to a true square or radii, a true balance throughout being the aim. Special modeling tools, also the compass, spirit level and square, are used. Every line is worked true and distinct, with all the expression desired. Every depression carries with it a cer-



Ceiling in St. Augustine's Hall, Boston, Mass.

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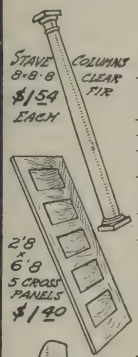

Seven transcontinental railroads distribute the product of our mills direct from our own forests to builders everywhere. You need no longer pay tribute to five middlemen in buying

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Save these profits for YOURSELF! We sell to YOU DIRECT!

You are building to make money. **Get on the profit side at the start** by buying your material direct from the man who owns the resources and save all middlemen's commissions for YOURSELF.

We manufacture our own lumber from our own timber—logged over our own road, cut in our own mill, and shipped direct to you. This means that we have broken away from the old lumber selling monopoly and that our reputation as one of the big lumber companies of the country is behind every statement we make and every piece of material you buy from us.

We **guarantee** better goods than you can get from your local dealer and SAVE YOU **25% to 50%**. By loading a full house bill into one car we can make you a big saving on freight, A SAVING THAT BELONGS TO YOU.

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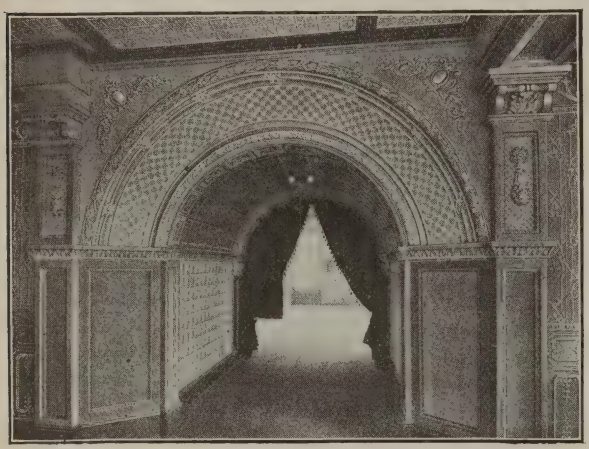
tain degree of draught, so that when the design is cast into a die it will work smoothly while operating in the presses.

When the modeling artist has completed his work on the clay cast, a plaster paris cast is taken from it, this being called a shell cast, and is just the antithesis of the clay cast. It is then necessary to take in plaster a cast of the



Berger's Metal Ceiling in Passage Office to Show Room of the Berger Manufacturing Company, New York.

shell cast, which is then a reproduction of the clay cast. Much careful attention is given this last cast by the modeler, every line and impression being gone over, trued, leveled and smoothed, after which it is given two coats of liquid shellac. It is now known as the plaster die, and is ready for casting into an iron die.

In this work care and judgment are imperative. The temperature of the molten iron and the temperature of the moulding room must be taken into consideration so that the cast will not cool too slow or too fast. The first retards sufficient and necessary shrinkage and the second causes too much shrinkage and the iron cast must shrink to this allowance, otherwise it is a faulty die and must be cast over and over until the shrinkage is perfect.

The iron cast is then taken to the machine shop, where the beads and buttons are hand cut into it and the entire cast milled and smoothed. It is then known as an iron die and is ready for adjustment on the anvil base in the press. In shop terms it is called a female or bottom die. The male or top die is cast on the press over the bottom die by pouring molten zinc of the necessary thickness over it. Having cooled, the top die is fastened and adjusted to the hammer head of the press and is ready to receive the operations of the steel sheets.

Either draw or drop hammer presses are used for stamping steel ceilings. As a rule stampings from a draw press are lacking in clearness on the center and inner portions of the plate, while on the drop hammer presses, as used by Berger's, every portion of the plate receives the same forceful blow, so that it is raised and brought out distinctly and perfectly. The force of the blow is regulated by the operator in raising or lowering the drop of the hammer head and bringing the plate home and true to the die impressions.

The sheet steel then passes to the shearing department, where the edges of the plates are sheared over a templet which guides the shearman in trimming perfectly and true. Every ceiling unit is sheared alike, making a complete and perfect member. Many manufacturers rely chiefly on the shearman's accuracy of eye, which accounts for uneven edges, some being sheared too far beyond the bead and others too high, making an imperfect bead joint.

Standard bead lap joint construction is used in the Berger steel ceilings. This is on the outer edges of the units, including field plates, borders, mouldings, cornices and side ornamented fillers having a head and button finish on one side. The bead is $\frac{3}{8}$ of an inch wide and $\frac{3}{16}$ of an inch deep, which permits a perfect fitting joint, whether on even or uneven surfaces.

The connections or joints are formed by lapping the various ceiling units, bead

Ceiling in Rockland Opera House.

fitting to bead. They are nailed to wood fumings or wood sheathings on the flat surfaces between the buttons and spacing beads. This system of nailing does not damage the buttons, but brings a tight drawing to the bead joints.

The many designs manufactured by the Berger Company are shown in the complete catalogue, which they send free to readers of THE NATIONAL BUILDER. This catalogue should be in the files of every contractor and builder anticipating the installation of metal walls or ceilings.

Sharpen Tools 30 Days FREE

Cut shop costs—make work easier

Don't waste hours sharpening tools when you can do the toughest grinding or sharpening job on this grinder in a few minutes. Keen tools make all your work easier and help you do more work in shorter time—don't take my word—take this machine 30 days in your own shop and then, if you wish, send it back at my expense.

DIMO-GRIT "—the wheel for steel"—25 times faster than grindstone—10 times more efficient than emery—will not draw temper

DIMO-GRIT, the new artificial diamond abrasive, is a twin product of carborundum, but DIMO-GRIT is especially suitable for steel, leaving the smoothest, keenest edge—cuts hardest steel as emery does soft copper. It peels steel away in tiny shavings instead of wearing it away like grindstones or emery wheels—never glazes—no heat developed—no need of hard pressing or water cooling—no danger of drawing temper. Genuine South African diamonds could cut steel no quicker. Outwears any number of emery wheels and grindstones. Carborundum wheels furnished if wanted.

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Engine and foot power—built all of steel—absolutely rigid—shaft drive like automobile—dust-proof ball bearings—gravity lubrication—runs 4,000 revolutions by foot power—easy as sewing machine—guaranteed five years—nothing to wear out.

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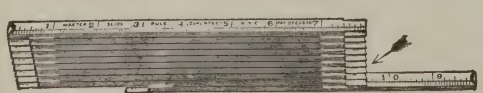

is the only **Rule in the World** whereby inside measurements of doors and windows, etc., can be taken rapidly and accurately. It is also far superior to any other rule for outside measurements of walls and ceilings, etc., as it can be extended and closed instadtly. **Mechanics, Buiders, and Architects, try one today! Don't wait!**

On receipt of 15 cents per lineal foot, a 4, 5, or 6 foot rule will be sent to you prepaid. Large profits to agents. Write for circulars and particulars.

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EXPANDED METAL CONSTRUCTION.

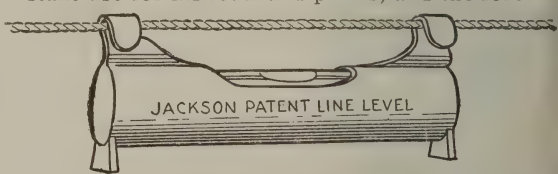
The continual pounding on fireproof questions which progressive magazines are constantly promoting has led to a number of designs for fireproof construction which shall be at once effective and within the means of the ordinary homebuilder.

One of the most effective means of securing fireproof results is by the use of expanded metal and cement stucco. Houses built of this construction have all the appearance and good qualities of solid masonry construction at a considerable saving in cost and have likewise all the good features of frame construction.

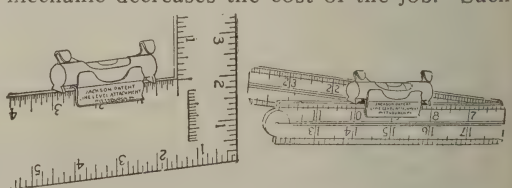
The Northwestern Expanded Metal Company, 945-975 Old Colony building, Chicago, Ill., have for several years been manufacturing expanded metal for various building purposes. They have prepared a number of booklets containing valuable designing information, tables and specifications for the use of expanded metal, and for the construction of silos, overcoated houses, stucco construction, plastering, etc. We understand that our readers can secure any of these books without cost, and at the same time be placed on the mailing list for a most interesting publication gotten out by the above company, showing various buildings in which material they manufacture has been used and giving a great deal of information regarding its use.

THE JACKSON ALUMINUM LINE LEVEL.

The labor of leveling and truing up, keeping everything plumb and straight, occupies a far greater portion of the mechanic's time than is generally considered. The mason spends a great part of his time making sure that his work is perfectly true, the carpenter has constant use for his level and plumb, and the foreman must carefully check the work of both of them, after giving them accurate levels and lines to start from.



Any tools, instrument or device which will lessen the work of either the foreman or the mechanic decreases the cost of the job. Such an instrument should be small, but above all accurate and with little possibility of getting out of order.



The Joseph Woodwell Company, 201-203

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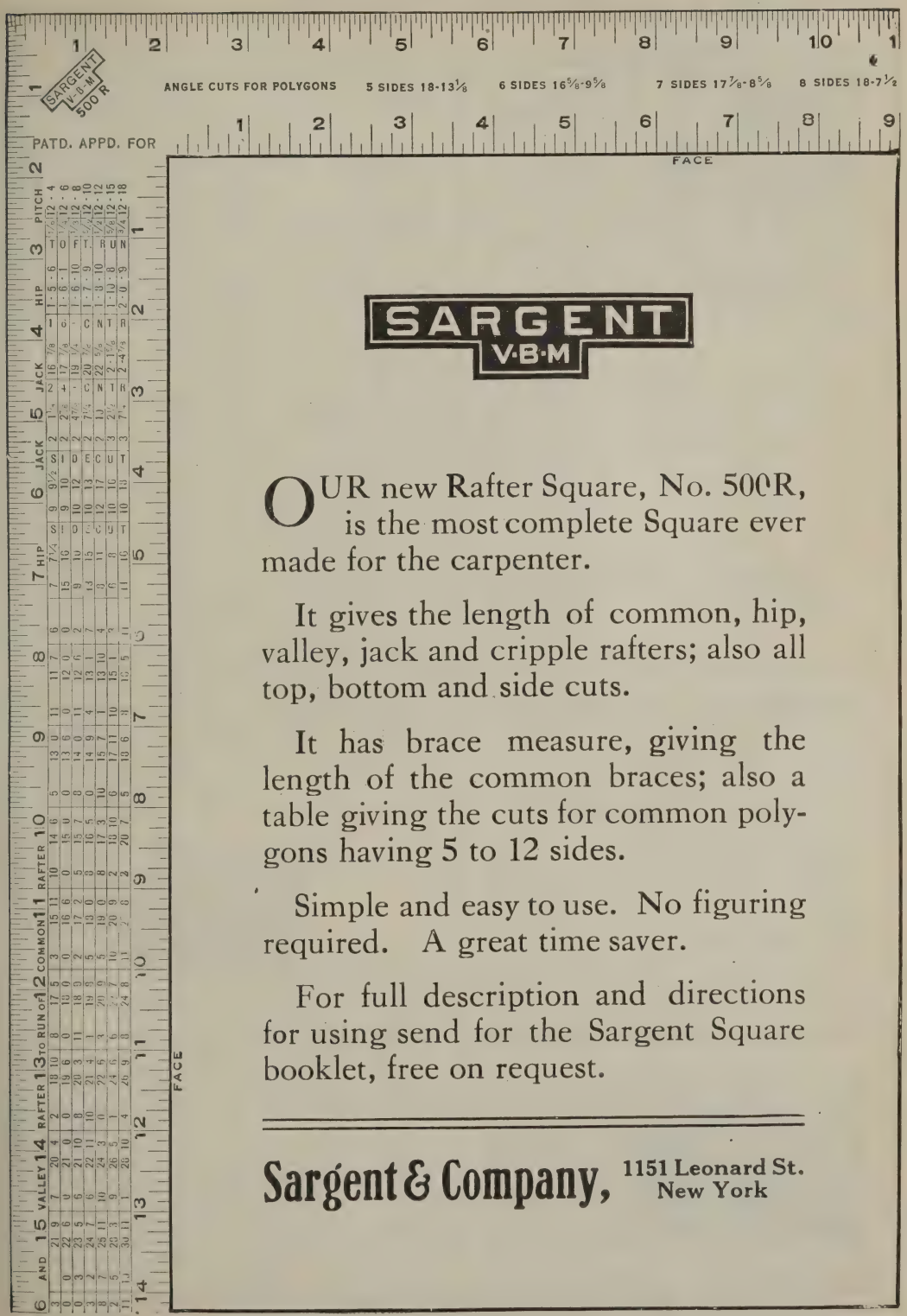

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It gives the length of common, hip, valley, jack and cripple rafters; also all top, bottom and side cuts.

It has brace measure, giving the length of the common braces; also a table giving the cuts for common polygons having 5 to 12 sides.

Simple and easy to use. No figuring required. A great time saver.

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Wood St., Pittsburgh, Pa., have for some years been manufacturing the Jackson Patent Line Level, which possesses a number of unique details for use about the building. Primarily designed for use for masons' work, it has at the top two small hooks by which it can be attached to a line, which can then quickly be made level. Another valuable feature permits it to be attached to either a steel square or a two-foot rule, as shown in the adjoining cuts.

The weight of this device, only one-fourth ounce, permits it to be carried in the pocket, so that it is always ready for use.

The Joseph Woodwell Co. have interesting circulars showing the use of the level under numerous varying conditions, and they will be pleased to send these circulars on request.

THE NIAGARA JUNIOR WALL PLUG.

One of the features of the old Roman buildings was the fact that the mortar was as hard as the stone itself. For many centuries the art of producing a mortar of this character was practically lost, and it is only in the last few years that cement mortar has begun to approach that of olden times in hardness. The use of lime produced a mortar, which for some time was soft enough to penetrate with nails or screws, but in the best construction today such a course is impossible, as the mortar will turn the point of the nail nine times out of ten. There still exists, however, the necessity for attaching furring, nailing strips, and other blocking to the masonry walls. The best device for this purpose has been found to be some form of wall plug. A style known as the Niagara Junior Wall Plug is shown herewith and is giving exceptionally good satisfaction wherever it has been used. As the

Niagara Junior Ball Plug.

plug is galvanized it will last as long as the building in which it is used. This plug is designed to build in the wall, as the work progresses, and so is immovably fixed in place. The erection of furring, blocking, etc., is greatly simplified by the use of plugs of this character and their general use is only a matter of having them brought to the attention of the progressive contractor and builder.

The Niagara Falls Metal Stamping Works, Niagara Falls, N. Y., have prepared a special folder, No. 57B, describing this plug, which is of interest to every contractor and builder. Their general catalogues of wall ties, sash pulleys, chain and fixtures will also be sent if requested.

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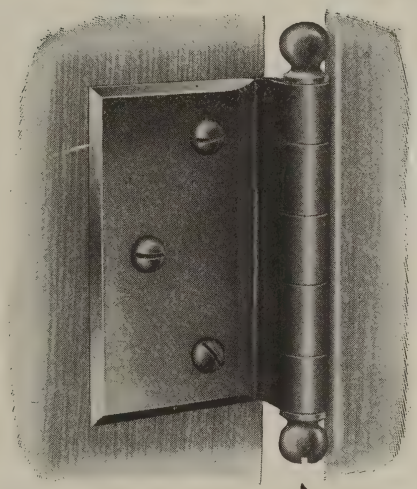
A Good Tip



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A HANDY REFERENCE BOOK.

The American Sheet & Tin Plate Company, Frick building, Pittsburgh, Pa., have recently compiled a valuable reference book showing the various grades, sizes, weights, etc., of galvanized sheets, black sheets and plates, corrugated and print sheets, brick and rock faced siding, terne plates, etc. There is also included tables of gauges, weights, standard sizes of these and other materials, as well as miscellaneous information regarding masonry and concrete construction.

While this book is designed to sell for $1.00, we understand that for a limited time the readers of THE NATIONAL BUILDER can secure it without cost.

DOES ADVERTISING INCREASE THE PRICE OF GOODS TO THE CONSUMER?

By W. M. Boggs.
Cortright Metal Roofing Co.

Scarcely a day passes that the proposition is not put to our salesmen, and we presume the same experience is had by salesmen of other standard lines—"Meet this price and you can have the order."

The price referred to, usually being the quotation of some competitor of imitation goods, who claims that because he doesn't advertise he is relieved of this fixed charge and therefore he is able to sell the goods cheaper.

The fact that he thereby admits he is trading on some one else's reputation, by taking advantage of a condition created by the other party, doesn't worry him a bit.

He glibly states, and in some cases it is true, that we are both buying raw material from the same source. He even goes further and displays practically the same design of shingle, which he has copied from us, and to all intents and purposes it looks like ours to the consumer, or it may be the dealer even. Yet both will turn around and offer us the business, if we will meet the price. Why? Simply that they have become so thoroughly impressed with the truth of the statements we have made through the advertising columns of various papers during the twenty-six years we have been in business that there is no room for doubt that the Cortright Metal Shingle is all we claim it to be, but—that story about the advertising increasing the price has sunk in.

"Why should I pay the price for a name, if these other shingles are just as good?" he says. True, quite true, you wouldn't do it, nor would I, but—Has the advertising increased the price? Has advertising had anything to do with marketing of the goods at all? Did our advertising create a demand for metal shingles? If it did, if the metal shingle was something that the public didn't want, but because we spent our money and the publisher inserted our announcements, the public was forced to buy our goods, then the publisher was a thief and a robber. On the other hand,

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The I. C. S. have taken thousands upon thousands of men and fitted them for larger and better-paying positions. What we have done for others, we can do for you. I. C. S. Courses are adapted to meet your particular need, for by a Course you can rise to a larger and more prosperous career.

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*Present Occupation*_____

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ELEVATORS

Dumb Waiters
Carriage and Store Elevators
Sidewalk Hoists, etc.

MECHANICALLY PERFECT

State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. WRITE TODAY.

Sidney Elevator Mfg. Co., Sidney, Ohio

DUMB WAITERS
FREIGHT ELEVATORS
PAVEMENT LIFTS

Easy to Erect and Easy Running

J. G. SPEIDEL
Reading, Pa.

Catalogue Upon Application

House Decoration

Comprising Whitewashing, Paper-hanging, Painting, etc. With 79 engravings and diagrams. Edited by Paul N. Hasluck.

Contents—Color and Paints. Pigments, Oils, Driers, Varnishes, etc. Tools Used by Painters. How to Mix Oil Paints. Distemper or Tempera Painting. Whitewashing and Decorating a Ceiling. Painting a Room. Papering a Room. Embellishment of Walls and Ceilings.

Price, postpaid, 50 cents

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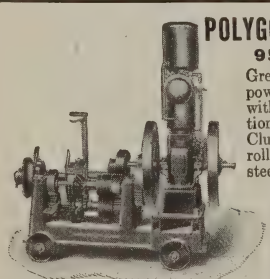
Our Complete list of Useful Books sent free.



POLYGON BUILDERS' HOIST
95% EFFICIENCY

Great lifting capacity in ratio to power. Reverses drum or sheave with engine running one direction. Patent Quadruple Helix Clutch. Cone friction. Cold rolled steel shafting. Semi-cast steel base and standards in one piece. Rigid, durable, simple. Steam, gasoline or electric power. All the advantages of others and then some. Don't fail to investigate the POLYGON before buying a hoist.

WATERLOO CEMENT MACHINERY CORPORATION
111 Vinton Street, **WATERLOO, IOWA**

if the demand already existed, and our advertising merely told the public where they could get the very thing they wanted, made in the way they wanted it and at the price they wanted to pay, then we both did the public a service for which we are entitled to a just reward for our efforts. But does that mean that we should get more for our goods because they were first in the market, were first advertised, and are largely advertised today? Certainly not, nor do we expect it, and what is more, the other fellow knows we don't expect it. He knows further that advertised goods, as a rule, must maintain a higher standard of quality than the non-advertised article. The man who advertises must convince the prospective purchaser that his goods have greater merit than all other competitive articles. In the case of metal shingles, the competition is not with metal shingles alone, but with wood shingles, slate, plain tin and other patented roofings. So that the advertiser of this line has a big story to tell and the goods must size up to his claims, therefore they must be made on a quality basis and price must only cut a secondary figure.

In proof of this, and to show to what effort we go to protect the consumer, we found the imitators making the strongest bid for galvanized goods, where to those who do not know very little apparent difference existed. We found these goods were often sold as genuine Cortright Metal Shingles, so to protect ourselves and the consumer we emboss the words "Cortright Reg. U. S. Pat. Off." on the fourth ridge of each shingle, thereby setting down the reputation of this company as a guarantee that each shingle is as represented, and further that the quality of the shingle is not regulated by the price.

As a matter of fact, with the large advertising we are doing we get less, and Cortright Metal Shingles cost the consumer less today, considering the increase in cost of raw material and labor, than previous to 1900, when we did practically no advertising, and this condition has only been made possible by the increased volume of business, for the quality of Cortright Metal Shingles has steadily increased as the makers of the raw material have found ways to improve their product, and our experience enables us to improve our methods of turning out the finished product. What's more, we intend to keep on improving the quality of Cortright Metal Shingles, and possibly give them wider publicity, irrespective of the price quoted by the imitator, as our experience has been that in selling a man a roof he is as much interested in what it is going to cost him after it is put on as before, and the only way to give satisfaction is to put the quality into it that will last. When you can point to roofs put on twenty-six years ago as good as new today, and have never needed repairs, it takes a mighty lot of price argument and advertising—increasing the cost talk to convince him that he is going to save in the long run by buying an uncertainty. That's why it pays to advertise.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The "TINNER'S TERNE"

For Better Business

To obtain best results–specify and insist upon having–

COPPER BEARING
Open Hearth Roofing Tin

Manufactured exclusively by this Company

Write for full information and quotations on MF and other high grade Terne Plates, Continuous Roofing Tin, Black Sheets, Apollo Best Bloom Galvanized Sheets, Formed Roofing and Siding Products, Metal Lath, etc. Every roofer and builder should have our new Pocket Reference Book. Send for it.

American Sheet and Tin Plate Company

General Offices: Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES

Chicago Cincinnati Denver Detroit New Orleans New York
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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Specialists and Manufacturers of

BUILT-UP VENEER PANELS

For Architectural and Interior Woodwork

Made up to your exact specification as to size, thickness, kind of wood required.

AMERICAN VENEER COMPANY

433 Market Street :: :: KENILWORTH, N. J.

CONSOLES, COLUMNS, and GRILLES

add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.

SEND FOR CATALOG No. 17

It contains many beautiful designs of Consoles, Columns and Grilles

Northwestern Grille Works

Office and Showroom, 1824 Milwaukee Ave., CHICAGO

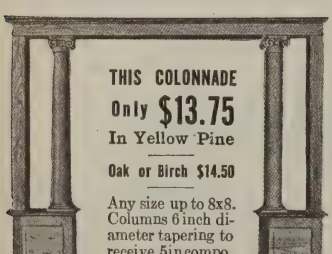
PHOENIX INSIDE SLIDING BLINDS

Comfort : Convenience : Economy

The lately patented springs and corrugated steel rods put the "Phoenix" far in lead of less improved styles.

WRITE FOR CATALOG P-T.

PHOENIX SLIDING BLIND CO., PHOENIX, N. Y.



THIS COLONNADE

Only $13.75

In Yellow Pine

Oak or Birch $14.50

Any size up to 8x8. Columns 6 inch diameter tapering to receive 5in compo. cap. Casings & cap trim not included.

THIS is positively the best Colonnade for the price in the market today. Take advantage of this special offer. Quality, satisfaction and safe delivery guaranteed. Order today. Give exact width and height of opening. State what kind of wood.

Our Catalogue No. 35 shows many new designs Write for it.

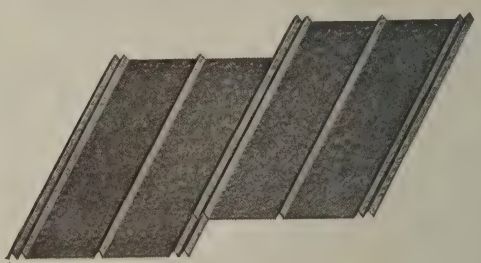
Bertelsen Adjustable Grille Co.

615-617 So. Clinton St., Chicago

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"JUSTRIGHT" GALVANIZED ROOFING.

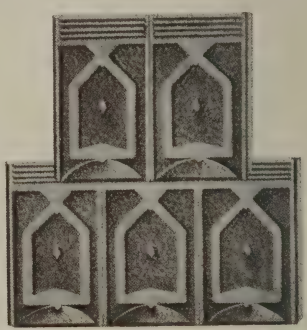
Perfect protection from the weather is secured in "Justright" Galvanized Roofing by a double V crimp, as shown in the cut on this page. This roofing is made by the Moeschl-Edwards Corrugating Co., 9th St., Covington, Ky., and we understand that it is proving immensely popular wherever it has been used. Another desirable feature is due to the stiffness which this crimping gives the sheets, it



being possible to space the roof boarding and so save on the lumber bill.

The accurate methods used in manufacturing this roofing produce a product which can be put in place without difficulty by anyone accustomed to ordinary accuracy in construction. For this reason, carpenters and builders find that it is an excellent material for roofs of any pitch. The size of sheets in which it comes, from five to twelve feet in length and two feet wide, permits of rapidly covering the roof surface.

Galvanized roofing of this character does not require painting to make it watertight, and the cost permits its use on buildings of even



temporary character, where the contents must be absolutely protected from the weather.

The Moeschl-Edwards Co. also manufacture the Standard Lock-Joint Metal Shingle in several styles and materials. The attractive appearance of these shingles as well as their value from a roofing standpoint makes them a valuable proposition for the up-to-date contractor to handle.

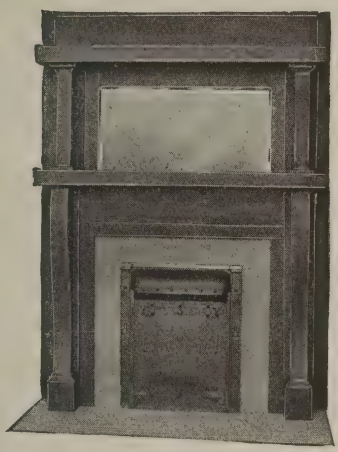
The Moeschl-Edwards Co. are widely represented at present, but they also have an attractive proposition to make to contractors where their goods are not otherwise handled.

$28.60

For this Elegant, Massive Selected Oak or Birch

Mahogany Finished Mantel

Beveled Mirror, 18x36 inches



No. 875½

"FROM FACTORY TO YOU"

Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns as shown in cut. **Dealers' price not less than $40.00.**

"Reputation and Quality Count"

CENTRAL MANTELS

are distinctive in workmanship, finish and style. Twenty-five years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

CATALOGUE FREE. Will send our new 100-page catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

Central Mantel Company

1237 Olive Street St. Louis, Mo.

MANTELS

AND FIREPLACES

BEFORE building or remodeling, be sure to send for our large new Catalog, describing the most complete line of Colonial, Mission, and Standard Mantels in the country. Also brick mantels and a large selection of fireplace fixtures, consoles, colonnades, etc.

All Our Goods Are Guaranteed As to Quality

CHAS. F. LORENZEN & CO.

703-709 N. Sangamon Street, CHICAGO, ILL.

BETTER MILLWORK

Plans by Geo. F. Barber & Co. Knoxville, Tenn.

Mr. Contractor, Are You Satisfied

that you are getting the best quality and service in Millwork and lumber that your money will buy? If not, let us prove to you that our **"BETTER MILLWORK"** and lumber is right in quality and manufacture, and that it will make you a **15 to 25% saving on every job.**

Write us now—we figure Millwork from plans

Chicago & Riverdale Lumber Co.

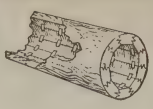
13537 Indiana Avenue

RIVERDALE, CHICAGO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

LOOK INSIDE!

SEE THOSE STAPLES.



STAY-LOCKED COLUMNS
DO STAY LOCKED

They're different—made to last and cost no more than inferior columns. Insist on having them—you'll not regret it.

Write for Catalog F—A beautiful free design book worth owning.

AMERICAN COLUMN COMPANY LTD.
BATTLE CREEK, MICH.

We manufacture everything in the line of

Consols, Colonnades Columns and Grilles

Special prices to the trade
Established 20 Years.

Chicago Grille Works
826-838 Wells St., Chicago, Ill.
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NEW CATALOGUE ON FINE CABINET WORK READY FOR YOU

Send For One

You will like our high class materials and workmanship. We carry a large stock of kiln dried lumber in both soft and hard woods, and can get orders out promptly.

Send Us Your Lists or Plans for Estimate

Let's get together now—We know we can please you.

HARTY BROS. & HARTY COMPANY
21st Place & Loomis St. Chicago, Ill.

MR. CARPENTER AND BUILDER! WHY NOT MAKE some extra money?

by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **Rolling Ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary te send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

Write for Catalogue

Milbradt Manufacturing Company
1442 N. Eighth Street ST. LOUIS, MO.

ALABASTINE OVER WALL BOARD.

The rapid increase in the demand for wall board, used to take the place of lath and plaster, has raised the question as to the best methods of securing proper decorative effects. Alabastine, the beautiful wall tint, so much in vogue in the best homes and on the best buildings, has come in for recognition as a suitable material for tinting and decorating on such surfaces.

The artistic Alabastine tints, particularly when properly set off with stencils manufactured by the Alabastine Company, leave nothing to be desired.

Panel work in connection with wall board is very desirable and different styles of panel work are shown in original colors by the Alabastine Company of Grand Rapids, Michigan, who will send samples.

The advantages of Alabastine are the beautiful, artistic tint effects, its durability, the fact that it is absolutely sanitary and at the same time that it is the most economical material that can be used.

Alabastine is not a cheap product in the old sense of the word, it being so fine in texture that a water color artist can paint a landscape or picture of any kind with Alabastine taken from the original package. When applied to wall surfaces it gives everything that can be secured or desired in the way of decorative effects. As the Alabastine Company put it—if Michel Angelo were on earth today doing his famous work, he would only have the choice of two mediums, water color or oil colors.

If he chose the former and their merits are recognized, he could not get a better carrier or vehicle for his colors than white Alabastine. With white Alabastine for a base any decorator can build up any color scheme known to the art and producable in water colors.

Alabastine also comes in a variety of beautiful tints and strong colors, ready prepared to mix and use by the addition of cold water, and these can be combined and intermixed in a way to get endless tint and color effects.

Notwithstanding its well known merit and quality, Alabastine can be used on ordinary walls in the regular tints or on wall board at an expense of not to exceed 1½ cents per square yard for material.

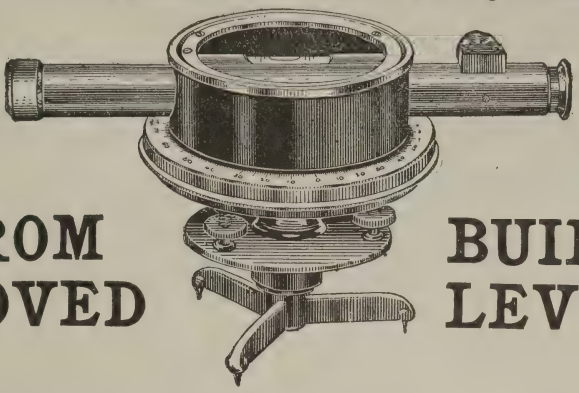
It can readily be seen that the expense of applying Alabastine is no more than would be that of applying the cheapest kalsomine or whitewash, as it is put on the same way, with a brush.

The Alabastine Company furnish stencils at the mere nominal cost of packing and transportation charges with no charge for the stencils for carrying out decorative effects in any rooms where Alabastine is used.

The advantage of Alabastine on wall board or any interior surface is that once applied to a suitable surface it can be tinted and re-tinted, that is to say, in the years to come another coat of Alabastine can be applied over its old coat without having to wash and clean off the

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Unanimous Endorsement of purchasers in EVERY STATE and practically EVERY COUNTY in the Union makes it the duty of EVERY MAN who has need for a Leveling Instrument to INVESTIGATE the



BOSTROM IMPROVED BUILDERS LEVELS

whether he is now in the market or not, as the novel elements of construction entering into the **BOSTROM LEVEL** afford **means** for **proving** the **accuracy** of your work which we GUARANTEE is not surpassed in even the most expensive engineering instruments, and that feature when combined with their **simplicity** affords ease and quickness of adjustment and operation which marks the greatest improvement made in leveling instruments during the last quarter of a century.

That Bostrom's Levels fill a long felt want among all classes requiring the use of a dependable instrument, is best indicated by the demand already created throughout the continent which has resulted in our manufacturing in such quantities as to save the purchaser about **one-third** the cost of the old familiar type architect level, as the price of our No. 3 is only $25.00 and No. 4 only $30.00; either outfit, including tripod, graduated rod, target, plumb-bob, etc.— the only difference being in the magnifying power of the telescopes, No. 3 being 10 diameters, and No. 4 being 18 diameters. Prices named are F.O.B. New York, Atlanta, St. Louis, and all Pacific coast cities. Shipping weight 15 pounds.

If not sold in your town, will ship direct on receipt of price; or will ship C. O. D. SUBJECT TO APPROVAL— money back, including all express charges paid, if dissatisfied or disappointed in any respect after thorough trial. Order direct from this announcement or write for illustrated description. Our reliability guaranteed by this publication.

BOSTROM-BRADY MANUFACTURING CO. 126 MADISON AVE. ATLANTA, GA.

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YOU KNOW THERE IS MONEY IN

METAL CEILINGS IF

THE PRICE IS "RIGHT"

That's why you should get Catalog D N and Discounts

Our Prices are Right and so are the Goods

THE KANNEBERG ROOFING & CEILING CO.

CANTON, OHIO

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Pittsburg Office
Royer Hotel Bldg.

Von Gerichten Art Glass Co.
Designers and Workers in
Decorative Glass
Quality not Quantity

Write or come to the Studios of the
VON GERICHTEN ART GLASS CO.
550-558 S. High St., Columbus, O., U. S. A.
Workers in Art Glass and Mosaics. Catalogue Free.

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Modern Carpentry and Joinery. Vol. I. By Fred T. Hodgson. 300 pages, 318 illustrations. Over one million copies have been sold. One of the best books for teaching the young workman the art of correct and easy woodworking. No bewildering formulas and algebraic puzzles. It can be understood by anyone who can read every-day English. Cloth.....$1.00

Vol. II. Similar to Vol. I, on advanced lines. Many of the more difficult problems of construction are solved fully and plainly. The author's method of explanation being adapted to the class of readers most apt to study the subjects. Cloth, postpaid.....$1.00

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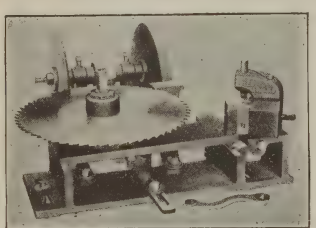


THE CONRAD
SAW
TOOL

Is a big money saver for Contractors, Builders and Millmen.

An inexperienced ordinary mechanic can

Gum, Joint, Set and Sharpen Circular Saws Easily and Perfectly

¶ The Conrad 14 inch machine handles saws from 5" to 24" in diameter and occupies only an 18 inch square.

¶ Price so low no one can afford to send saws away for repairs.

Write for Circular N, and Special Offer.

H. G. CONRAD, 709 So. Clinton St., Chicago, Ill.

143 Cities Used "STONEKOTE" Rough Cast In 1911

M.C. Clapp Res., Wichita, Kan.

Before you build or repair the old home have your architect write us for book telling of "Stonekote" Portland Exterior. What color would you like a sample to be; Gray, Silver Gray, White, Buff, Red, Brown?

THE GARDEN CITY SAND COMPANY
MANUFACTURERS
709-11 Chamber of Commerce CHICAGO, ILL.

old coat, and tints may be changed as desired.

An advantage of the Alabastine wall is that the expense is not so great that the owner feels that he must keep that same tint until it is absolutely too badly soiled to be livable, but the tint can be changed and entirely new effects produced at frequent intervals if it is desired. Should it be deemed desirable or necessary at any time to wash off the old coats of Alabastine, it can be readily done.

The manufacturers of the various wall boards recognize the advantage to them in the use of Alabastine, as it enables the party using wall board at a minimum of expense to get the maximum of artistic results.

Write any manufacturer of wall board to send you a sample decorated with Alabastine. There are various ways of treating wall board.

Mr. Hamilton, manager of the Alabastine Company, will be glad at any time to send color ideas or suggestions for carrying out any decorative effects or send samples showing panel effects particularly adapted to walls in which wall board has been used. Better write for their free stencil offer.

THE STANDARD CART CHARGER.

Every contractor who has used a concrete mixer realizes the importance of being able to get the material into the mixer with the least possible labor. Almost any mixer will shake up the materials after they are once in the drum so as to produce concrete much better than can be mixed by hand, but there is sometimes a considerable effort to raise the materials high enough to get them into the mixer.

The Standard Scale & Supply Co., 1345-1347 Wabash Ave., Chicago, Ill., have designed their Standard Low Charging Concrete Mixer

to obviate the necessity for lifting or wheeling on to a high platform. With their largest machines, it is only necessary to raise the materials two or three feet in order to dump into the drum. The cut on this page shows the height to which materials must be raised, and it also shows a novel arrangement by which entire cartloads may be drawn up the small incline to the mixer. In this arrangement, as will be seen, a cable is attached to the axle of the cart and the same engine which operates the mixer draws the cart into dumping position.

The importance of a labor-saving device of this character is readily seen by every con-

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BUFFALO WIRE WORKS CO.

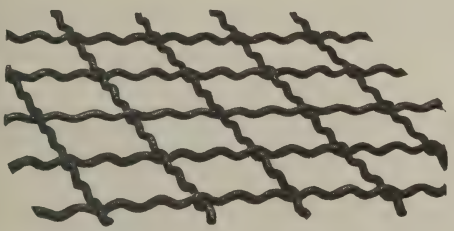
FORMERLY

Scheeler's Sons

Manufacturers of

WIRE CLOTH

Crimped Wire Concrete Reinforcement, Plain and Galvanized, in all size meshes and Gauges of Wire.



WIRE WORK

Plain and Galvanized Wire Lathing, also Grimm's Galvanized Corrugated Wire Lathing.

Buffalo Wire Fencing.

ARTISTIC METAL WORK

AGENTS FOR

Clinton Electric Welded Fabric

Samples and Prices Upon Application

SEND FOR OUR No. 5 CATALOG.

442 TERRACE

BUFFALO, N. Y.

Residence of E. W. Twaddell, Devon, Pennsylvania. Roofed with Asbestos "Century" Shingles by E. S. Parson, Philadelphia, Architect; and Simon Heister, Wayne, Contractor. From an Artist's Drawing.

Asbestos "Century" Shingles

"The Roof that Outlives the Building"

Fire loss from **inflammable roofs** costs the property owners of this country over Forty Million Dollars a year—fires that start outside the building, due to somebody else's hard luck or carelessness.

A man cannot change his neighbor's habits—but he can guard against them by roofing with Asbestos "Century" Shingles.

These Shingles are made of reinforced concrete—of cement reinforced with interlacing asbestos fibers.

They are made by the "Century" process, which distributes the asbestos **evenly** in the cement.

Neither cement nor asbestos will burn. And thanks to the "Century" process, these Shingles will not crack in the fire—split, chip or warp.

Feature Asbestos "Century" Shingles **by name.**

Write us for prices and terms—and Booklet "K. & M. 1912."

Keasbey & Mattison Co.

Factors

Ambler, Pennsylvania

Branch Offices in Principal Cities of the United States

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Northwestern Terra Cotta Company

Manufacturers of High Grade

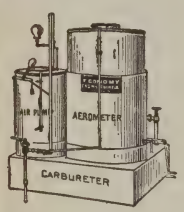
ARCHITECTURAL TERRA COTTA

ENAMELED WORK A SPECIALTY

Main Office and Works, 2525 Clybourn Ave.
Branch Office, Room 1415 Railway Exchange

CHICAGO, ILLINOIS

Automatic Safe-Sanitary Gas Light and Fuel



Best for cooking and heating water for kitchen, bath and laundry.
No charging, no cleaning.
No generating, no dirt, soot, fuss or muss.
Cheaper than electricity, cleaner and safer than kerosene or acetylene (in use 16 years.)

Today is the time to write HOME department of
ECONOMY GAS MACHINE CO., 437 E. Main St., Rochester, N. Y.

DIAMOND EXPANSION BOLTS

Diamond "N" Screw Anchor
For fastening all kinds of material to brick, stone or concrete

Diamond "N" S eld

Diamond "N" Steel Drill

DIAMOND EXPANSION BOLT CO. 90 WEST ST NEW YORK

The Architects' and Builders' Pocketbook (Kidder).—The Fifteenth Edition. - Revised and enlarged. 1,700 pages, 1,000 engravings, morocco binding. Price.....$5.00

In the author's own words, it is "a general index to the many lines of work, methods, materials and manufactured products entering into the planning, construction and equipment of buildings."

The new edition contains extended chapters on fireproofing and reinforced concrete.

A modern construction handbook, indispensable to the professional man and the student of today.

Postpaid on Receipt of Price

Hodgson Book Company
537 S. Dearborn St. Chicago

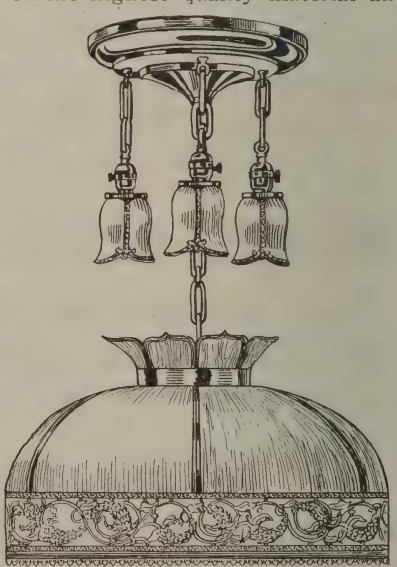
tractor. In wet weather, the runways become slippery and even in dry weather the mixing water is frequently spilled on the runway, which makes pushing a wheelbarrow up an incline extremely difficult. This device entirely overcomes this trouble.

There are also times when the mixer must be raised higher than would otherwise be necessary; for instance, working over a sidewalk or other obstruction. With a hoist of this character there is no delay in keeping the mixer supplied with material.

The Standard Scale & Supply Co. have a number of other interesting arguments in favor of their machinery and will send their complete catalogue, or such other information as the contractor desires upon request.

ATTRACTIVE SHOWER DOME.

The illustration shown here gives an idea of the latest method of dining room lighting for the home beautiful. The three lights above hang within one to two feet from the ceiling and the dome hangs regulation length above the dining table. The Chicago Gas Appliance Co. made this effect with many different styles of domes. Like all the fixtures designed and manufactured by this company, this shower is made of the highest quality material and by



skilled labor. Being the originators of the shower dome and having unusual manufacturing facilities, the Chicago Gas Appliance Co. are able to quote the very lowest of prices.

Contractors and builders can buy the complete electric or combination fixtures for a four to seven room house from this company for about $26.00 to $32.00. Each fixture is of the best quality of brass finish and the designs are all first class.

The Chicago Gas Appliance Co., 30-32 W. Lake St., will mail a set of blue prints for the asking to those interested in artistic and well-made lighting fixtures.

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THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

FALSE WORK NO LONGER NECESSARY

Berger's Ferro-Lithic Reinforcing and Furring Plates

represent one of the simplest and least expensive methods of reinforcement for concrete floors, walls, etc. Due to the cross-ribbed, dovetailed, keystone formation, they not only are exceedingly strong and stiff, but afford excellent plastering surface on either side. They may be placed on a building for some time without plastering or concreting. This means that the building may be erected at any time or season, but the plaster and concrete not applied until the weather is favorable. This is only one of the good points of Ferro-Lithic.

If you do not have our catalog of information and illustrations, you are overlooking an excellent opportunity. Get in touch with the nearest Berger Branch named below and a copy will be sent you immediately.

THE BERGER MANUFACTURING CO., Canton, Ohio

For the best service address the nearest branch

NEW YORK BOSTON PHILADELPHIA MINNEAPOLIS SAN FRANCISCO ST. LOUIS

Also manufacturers of Metal Lumber, Prong Lock Studs and Furring, Rib-Trus, Ferro-Lithic and Multiplex Reinforcing Plates, Metal Ceilings, Expanded Metal Lath, Sidewalk Forms, Raydiant Sidewalk Lights, etc.

"A SAFE INVESTMENT"

PLACE YOUR ORDERS WITH

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MAKERS OF

HALF TONES - ZINC ETCHINGS
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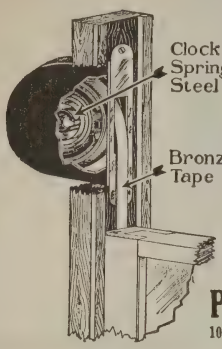

Unit Sash Balances

Patent Pending

Take the place of weights and cords in new buildings. Cost less than weights and cords. Weights and cords are always getting out of order, Unit Balances never are. Unit Balances have uniform face plates—All mortises cut at the mill.

UNIT BALANCES are Sold at a Flat Rate Per Window

Send for New Catalog with Detail Drawings and Prices

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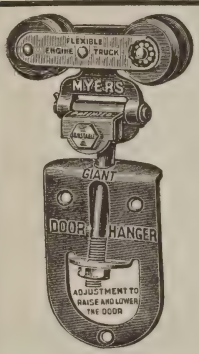
10 Allen Street ROCHESTER, N. Y.



MYERS GIANT

and New-Way Adjustable Tendem Door Hangers

PATENTED

For Tubular Girder Track

Are adjustable up or down, and in or out. Trolley Wheels are heavy turned steel, revolving on steel roller bearings, and run inside the tubular girder track. Not affected by rain, sleet or ice. Write for descriptive circulars and prices.

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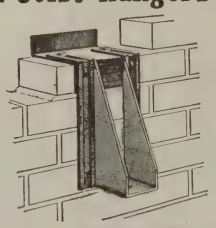
ASHLAND, OHIO

Van Dorn's Steel Joist Hangers

No. 1. Steel Joist Hanger for Wood Header.

Have no Equal. Send for Catalog



No. 4. Steel Joist Hanger for Brick Walls.

VAN DORN IRON WORKS, Cleveland, Ohio

Principles and Practice of Plumbing.—By J. J. Cosgrove. Fully illustrated with tables and diagrams, handsomely bound in cloth. Net. Price.....$3.00

In preparing this book the author has studied to make the subject matter so clear and concise that the average layman can readily comprehend the principles that underlie the practice of plumbing. Architects and Engineers, as well as Plumbers and Builders, will find it a book of great assistance to them.

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BESTWALL PLASTER BOARD.

Improvements in building construction have not been confined to the larger classes of buildings, such as skyscrapers, factories, etc., but on every hand we see instances where the minor details have received thoughtful consideration, not alone from a standpoint of construction, but of materials and workmanship as well. In steel construction we see a vast improvement in the present form of built up members over the original cast iron bolted construction. In fireproofing, the tile sections of a few years ago are being replaced with more scientific forms and with concrete and other improved designs.

In the interior, there has been a constant attempt to simplify the construction, as well as to make it stronger, more fireproof and more pleasing to the eye. Only a few years ago there was little choice in the finish which we could give the rooms, either in the large, monumental buildings, or in the humble dwellings. At an enormous expense the walls could be lined with marble or other decorative stone, ornamental plaster or wood paneling. Today, however, we have a wide choice of materials, which can be applied either to a plastered surface or to most of the various forms of wall or plaster boards.

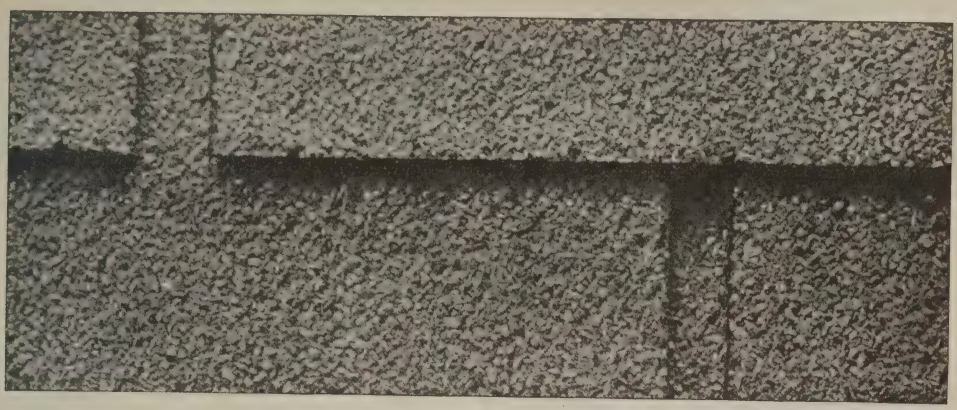
One of the latest forms of plaster board to be placed on the market is called the "Bestwall." This board, as made by the Bestwall Mfg. Co., 1247 First National Bank building, Chicago, Ill., possesses several features not found in other boards of this character. The makers claim that this board is non-inflammable, being made from a rock plaster composition, surfaced with heavy fiber paper. The process of manufacture saturates this paper with the plaster composition so that it will not ignite even from a flame applied directly to the surface.

It is claimed that Bestwall Plaster Board being almost entirely free from vegetable matter will neither warp nor shrink from exposure to heat, cold or moisture as do most of the other preparations used for this purpose. The advantage of this quality is appreciated when one considers using it for any room which is to be highly decorated, either by painting or kalsomining, or by a paper, burlap or similar wall covering.

Bestwell Plaster Board is made in sheets four feet wide and six feet long, which renders the labor of covering a room very small compared with lath and plaster, or other preparation. It can be put up by any carpenter or in fact by anyone ordinarily handy with tools. On account of its composition, it can be easily cut with a saw, and lacking a grain, all of the small pieces can be worked up to advantage around door and window openings.

Bestwall Plaster Board is handled by a large number of dealers throughout the country and has been exhibited at a number of the cement and building shows during the past year. The manufacturers, however, will be pleased to send detailed information regarding the manufacture, installation, and use of this material to such of our readers as request it.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



DEEP red, greenish gray and brown—rich, beautiful colorings—and all simply the natural slate and granite—no dye—nothing that can either fade or wash off—

FLEX-A-TILE
ASPHALT SHINGLES

are made of solid asphalt, into the surface of which chipped slate or granite is rolled until it becomes an actual part of the shingle—The result is a beautiful stone-like appearance and a wonderfully artistic and durable roof—

Flex-A-Tile Asphalt Shingles are 8 by 12½ inches in size—It only requires 424 of them to cover a hundred square feet—They are easily and quickly laid—are low in cost and will last as long as the house stands—They are also fire resisting.

We want to send you a sample free—Send us your name

THE HEPPES COMPANY

1012 Forty-fifth Avenue CHICAGO, ILL.

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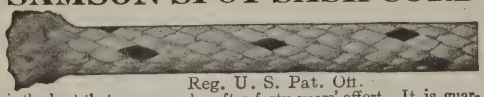
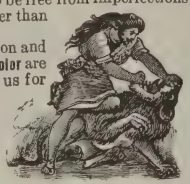
SAMSON SPOT SASH CORD



Reg. U. S. Pat. Off.

is the best that we can make after forty years' effort. It is guaranteed by the Samson Cordage Works to be free from imperfections of braid or finish, and it will last longer than any other device for hanging windows.

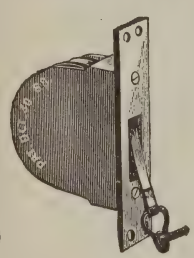
Our trade mark on the label is Samson and the Lion **in any color.** The Spots **in any color** are our trade mark on the cord, used by us for 18 years to show, after the label is removed, who guarantees the quality of the cord. You recognize either of these marks by the design, not the color. Don't be misled by imitations.



Samson Cordage Works,
Boston, Mass.

Reg. U. S. Pat. Off.

Caldwell Sash Balance



Does away with weights and cords and **vastly** more durable. Makes sashes work perfectly. Permits greater window space in new work, as box frames are not necessary. May be applied to old windows without altering sashes or frames.

Write for Circular to the

Caldwell Mfg. Company

2 Jones Street Rochester, N.Y.

HAVE YOU POWER BORING MACHINES?

IF SO, No Sash Pulley Can be Classed with the

Grand Rapids No. 12

Mortised at one Punch with the **Quadruple Bit**

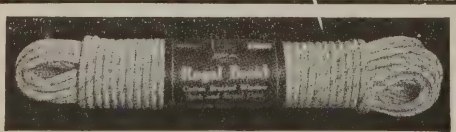
or bore four holes with a single bit and it's done.

No cutting, fitting nor trimming. Saves time and money. Write for Free Samples.

Quadruple Bit, Price $5.00
Can not be used in a hand brace.

Grand Rapids Hardware Co.

118 Pearl St., Grand Rapids, Mich.



Regal Sash Cord is always marked with **Two Blue Strands.**

This sash cord has been approved by the United States Government and many leading architects. It will outwear the best chain 3½ times. It is perfect in construction and, therefore, without waste. *Send for the surest test, that made by the Government, and for free samples.*

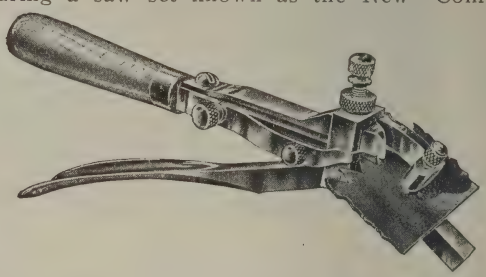
Puritan Cordage Mills

1560 Story Ave. Louisville, Ky.

THE SMITH SAW SET.

To secure good work from a hand saw, the teeth must be properly set. Each tooth must cut at exactly the same angle and each tooth must do its share of the work. A poor saw set means that the wear will come on a few of the teeth, resulting in slower work and requiring more effort.

Otis A. Smith, Rockfall, Conn., is manufacturing a saw set known as the New "Com-

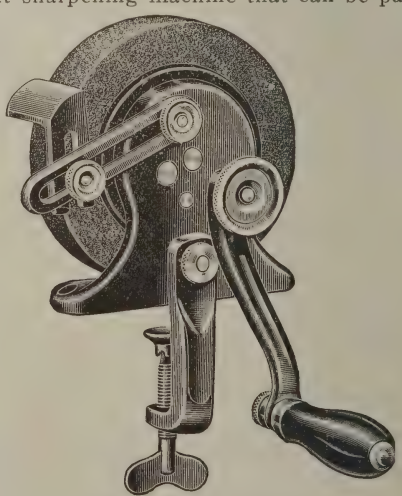


plete," which embodies several features not found in other tools of this character. We note especially that an adjustable side gauge brings the point of each tooth under the center of the anvil. An adjustable clamp screw regulates the amount of the set. The tool is so designed that it can practically be worked with one hand only, allowing the free use of the other hand.

Mr. Smith will be very glad to send more detailed information to those who are interested in having their outfit complete in every respect.

ANOTHER LUTHER GRINDER.

A new machine just put out by the Luther Grinder Mfg. Co., 919 Michigan St., Milwaukee, Wis., fills a long-felt demand for an efficient sharpening machine that can be packed



into small space. This new Dimo-Grit Grinder No. 35 incorporates these points in a unique and interesting way.

All the mechanism of the machine is contained within the wheel itself. The wheel is

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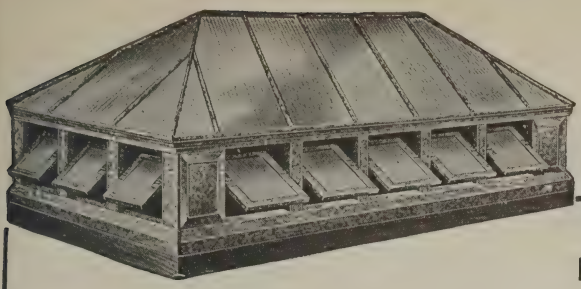


WILLIS
Self-Installing
SKYLIGHTS

From Factory to Builder
No Other Labor Necessary

Willis Skylights are constructed so that any person handy with a hammer or screwdriver can install them. It is not necessary to have a soldering outfit or tinners' tools.

They are shipped knocked down after being set up and tested in the factory, are watertight without the use of putty and designed to give the greatest amount of glass area. The ridge and gutter bars cannot sag, buckle or spread.

Send us your plans or a rough sketch with dimensions and we will furnish working drawings and an estimate. **You can install it yourself.**

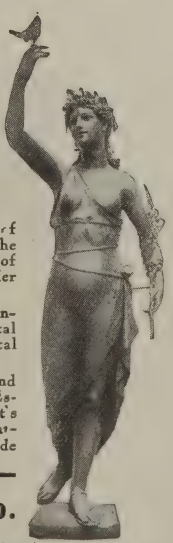
Catalogue No. 6 gives our large line of other Sheet Metal Building Material. Send for it.

WILLIS MFG. CO., GALESBURG, ILL.

Sheet Metal Statuary *of* Rare Artistic Worth

WITHIN the last quarter of a century there have been reproduced at the Mullins factory, Salem, Ohio, statues of Sheet Bronze and Copper that are nothing short of marvelous. Many of them were made from the models of famous sculptors, to their entire satisfaction.

We are prepared to reproduce, in minute detail, the most delicate lines of any model. It is this faithful portrayal which helps to account for the world-wide fame of Mullins Sheet Metal Statuary. Diana on the top of Madison Square Garden, the group on the New York Life Building, the Statue of Progress, Chicago, are among our earlier achievements.

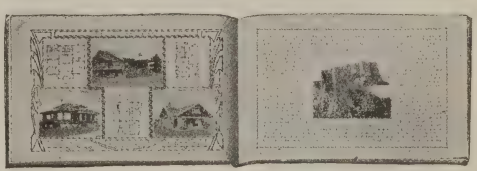


We also make Fireproof Metal Windows, Skylights, Cornices, Finials, Metal Tile Roofing and Sheet Metal Ornamental Work of every description.

Tell us what you're interested in and we'll send the proper catalogs at once. Estimates promptly submitted on architect's drawings. Attractive prices. Quick, satisfactory service. Discounts to the trade on application.

The W. H. Mullins Co.
210 Franklin St., SALEM, O.

"Be the Bungalow Man of Your Town"



This Bungalow Book FREE

The Bungalow covered with **Red Cedar** Shingles from "crest to foundation" has come to stay. Everybody likes it. Shingles afford the most artistic effects. Can be stained in any color to harmonize with surroundings. Stain costs only half as much as paint. You stain a bungalow once while you paint clapboards twice. And remember

Washington Red Cedar Shingles Do Not Warp

Our Bungalow Book contains Photos and Floor Plans of genuine Pacific Coast Bungalows—with actual cost to build in the Pacific Northwest. It tells "The Story of Red Cedar Shingles and their wonderful long life."

Red Cedar Shingle Mfrs. Association
Representing over 200 Mills—Daily capacity 20 millions
497 Arcade Annex **SEATTLE, WASH.**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE NEW "COMPLETE" SAW SET

A glance at this cut will convince you that every practical, common sense feature is embodied in this tool. A few of which are: Adjustable side gauge which brings the point of each tooth under the anvil. Top Clamp Screw when adjusted, regulates the amount of set. The setting or wearing surfaces are made of Tool Steel and carefully hardened. Front Screw holds down Saw, allowing free use of left hand. Compact, attractive and low in price. Black, 75c. Nickel, $1.00. Order of your dealer or a sample will be sent on receipt of price.

OTIS A. SMITH, ROCKFALL, CONN.

WORK BENCHES

Rapid Acting Vises
Drawing Tables
Drawing Boards
Drawing Cabinets
Electrotype Cabinets

We also make Turnings and Special Wood-work of all kinds to order. Don't buy until you get our Catalogue and prices.

Henry Rowe Mfg. Co. NEWAYGO, MICH.

A Tool Bag For You

Mason's, Joiner's, Carpenter's

Mason's Tool Bag.

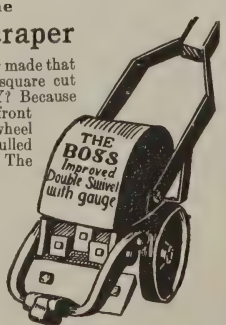
In fact we make Tool Bags in Canvas and Leather for every Mechanic. Want our Catalogue?

Excelsior Bag & Mfg. Co.
TROY, N. Y.

It Works Like a Plane

The Boss Floor Scraper

The Boss is the only Floor Scraper made that will plane a floor without leaving a square cut where knife-first starts cutting. WHY? Because the Boss is made with a gauge on front to which is attached a pear shaped wheel which raises when the machine is pulled and lets the knife down gradually. ¶ The Boss can be set for any thickness of shaving. It also can be set for any shearing cut; right or left, up or down, to suit the kind of lumber. ¶ It is guaranteed to give absolute satisfaction.



G. J. KEPPLINGER
Main Office, Dwight, Ill.
MANUFACTURED ALSO IN CANADA

hollowed out to contain a series of four driving gears and pinions. These produce a speed of twenty revolutions of the grinding wheel to every turn of the handle, which is higher than most of the other sharpening machines on the market today. All bearings are constructed in one piece and everything is enclosed and dust proof. The machine is finished in red and black enamel. The wheel is of Dimo-Grit, the new "diamond" sharpening substance.

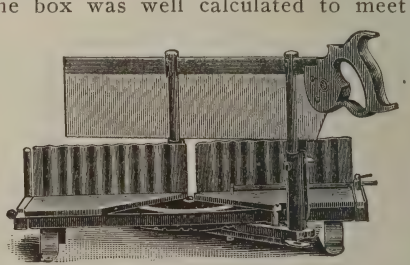
The space required for carrying this grinder is scarcely greater than the wheel itself. The wheel is 5½ inches in diameter, and the entire machine packs in a box 5¾ inches long. All the different parts, including the handle, clamp, tool rest, etc., can be easily and quickly taken apart for packing. Its particular use is to be found with carpenters for their tool chest, for miners, surveyors, prospectors, woodsmen and sportsmen; in fact, all who have tools to be kept sharp but cannot have them in a permanent work shop.

This is only one of the many styles of grinders manufactured by the Luther Company. A complete catalogue, showing machines for practically every possible purpose, will be sent on request.

THE GOODELL STEEL MITRE BOX.

In placing on the market a steel mitre box, the Goodell Mfg. Co. had in view the hard usage which such a tool meets in the shop, on the job and on its numerous trips from place to place. They believed that cast iron, from its brittle nature, was entirely unsuited for the purpose, although the wearing quality might be about the same. Wood, which had lightness in its favor, would not stand the weather and dampness which frequently penetrated even the carpenter's tool chest.

The favorable comments which have been received on this mitre box indicate that the material was well chosen and that the design of the box was well calculated to meet the



carpenter's needs. It is designed to be used at any angle, the graduations being such that when two opposite cuts are wanted, the box is readily adjusted to cut them. Automatic stops hold the saw up, allowing the operator to use both hands in placing the work in position.

The complete circular of the Goodell Steel Mitre Box shows in detail the construction and advantages of the styles and sizes in which it is made. This circular will be sent upon request to the Goodell Mfg. Co., Greenfield, Mass.

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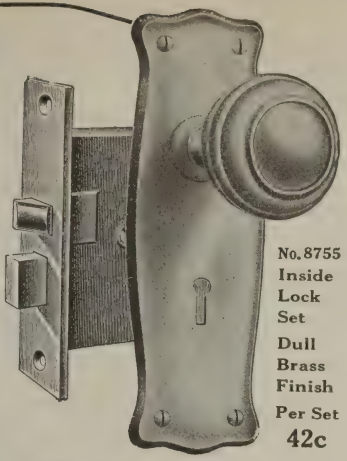
Have YOU Seen Our

Builder's Hardware Catalog and Net Price List



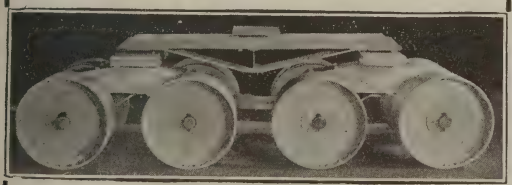
No. 8755 Inside Lock Set Dull Brass Finish Per Set 42c

We will send it postpaid to Contractors and Material Men and Carpenters.

We do not sell to contractors or carpenters in Cook County, Illinois.

Rehm Hardware Co.
1503 Blue Island Avenue
CHICAGO, ILL.

Move the Old House to Another Lot
Instead of Wrecking It
You Can Make More Money by Doing So



THE LA PLANT HEAVY HOUSE MOVING TRUCKS ARE MADE OF STEEL

On scientific lines—are interchangeable so they can be worked singly, in pairs or in fours.

WRITE FOR CATALOG N

and see how easy it is to wheel a building a mile in a day—and how little the cost is for La Plant outfit compared with the profit to be made in moving houses instead of wrecking them.

LA PLANT TOOL CO.
900 E. Nevada St., Marshalltown, Iowa

Your Stucco or Concrete House Needs Bay State Brick and Cement Coating Protection

The coating does not destroy the distinctive texture of concrete, protects against dampness and moisture and has been endorsed by the National Board of Fire Underwriters as a fire retarder. It comes in different colors.

Let us send you a booklet that tells you all about it. It has been used by the best architects, contractors and builders as a coating in light as well as heavy construction of every kind; houses, mills, breweries, garages and railroads.

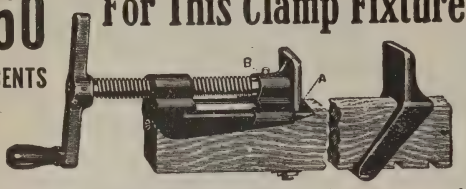
It is very effective as a tint for interior decoration on wood, cement or plaster.

Address for Booklet No. 10

Wadsworth, Howland & Co., Inc.
Paint and Varnish Makers and Lead Corroders
82-84 Washington Street Boston, Mass.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

50 CENTS For This Clamp Fixture



It is unequaled for strength, quick action, and lasting qualities.

Write for catalog of Sheldon's Clamps and Vises

E. H. SHELDON & CO. 178 Nims St. MUSKEGON, MICH.

Last a Lifetime and Give Satisfaction to the End!

The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalog. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book, "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

D.R.BARTON 1832. ROCHESTER,N.Y.

MACK & CO., Sole Makers

Brown's Race Rochester, N. Y.

Automatic Sash Holders

Do away with Sash Weights, Cord, Pulleys Pocket Frames, Etc.

A positive and durable device that holds window in any position desired and that cannot get out of order.

For old as well as new windows. No broken cords, no binding pulleys, no rattling windows.

And they are economical—Made in three styles, for sash weighing up to 8 lbs., up to 20 lbs. and to 35 lbs. and more.

If your hardware dealer does not have them send us $1.00 for a trial set, charges prepaid, together with your dealer's name.

ANYHOW send for literature and prices.

Automatic Sash Holder Mfg. Co.

48 Church St., New York

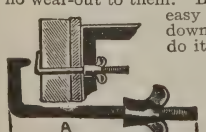
$13.95 PER DOZ.

(If You Send Cash With Order)

The Taylor Steel Scaffold Bracket

Absolutely Safe,

for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.



Write for Catalog of Builders' Specialties

James L. Taylor Mfg. Co.

Poughkeepsie, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

CABOT'S DAMP-PROOFING & WATER-PROOFING.

The necessity for protecting construction work above the ground is too obvious for cement. Wood must be frequently painted, metal work must be protected at all times, and even the masonry must be carefully pointed to keep water and frost from entering the cracks and joins, and so disintegrating the otherwise massive and stable walls.

Below grade, however, a great many contractors and builders are unable to see why provision must be made to protect the masonry. It is commonly supposed that concrete, brick and stone grow harder with age and exposure to moisture. To a limited extent, this is more or less true, but there is a point at which too much moisture becomes a damaging factor, and it is with a view of eliminating it that Samuel Cabot, Inc., Boston, Mass., has prepared a waterproofing composition, which penetrates the pores of the concrete, brick or stone and seals them effectively, so that it will resist considerable hydraulic pressure.

The advantage of using a preparation of this character is in the increased value of the basement space, as that part of the building is entirely dry, where otherwise the walls would probably be damp, the decorations or painting damaged and the place insanitary.

Above the ground there is also many places where a damp-proofing preparation is advisable and even necessary. The popular styles of stucco houses require an impervious coating which will prevent moisture working through to the interior of the wall. Soft brick and concrete construction rapidly absorbs moisture and its surface should be protected.

There are two preparations manufactured by Samuel Cabot Co., Inc., Boston, Mass., especially for construction of this character. The one known as Cabot's Black Waterproofing is for waterproofing foundation, basement and other walls above or below grade; the other Cabot's Damp-proofing is for direct plastering on brick and concrete. Both of these preparations have been on the market for many years and the condition of the work which they have protected would indicate that the preparations are properly proportioned. The use of these preparations is described in the circulars which the Cabot Co. will be glad to send to interested readers.

METAL CEILINGS.

The Edwards Mfg. Co., 430-450 Eggleston Ave., Cincinnati, O., are making special efforts to interest carpenters, builders and contractors in their metal ceilings and walls. The advantages of a metal covering from a fireproofing standpoint is too obvious to require further comment, and the tasty designs in which the work is executed, and the pleasing effects obtainable by various patterns is making this class of work extremely popular.

The fact that the average mechanic can put up work of this character, without the use of special tools or without employing high-priced

Read These Two Valuable Letters About CORTRIGHT Metal Shingles!

Corydon, Ky., Aug. 6, 1907.

GENTLEMEN:—

I take pleasure in sending you photograph of my residence, roofed with Cortright Victoria Shingles.

The residence of my father has been covered with your Metal Slates for over fifteen years and has always given the greatest possible satisfaction.

The Livesey Memorial Christian Church is also roofed with Cortright Metal Slates, also two residences on the next block, which have been very satisfactory.

Yours very truly,
HARBERT L. KING.

Corydon, Ky., Feb. 16, 1912.

GENTLEMEN:—

Replying to your inquiry relative to your Metal Shingles with which I roofed my residence in 1906, will say that this roofing has given complete satisfaction, which is as strong a recommendation as I can give.

I expect to build again within the next few months, and rest assured the architect will be instructed to specify "Cortright" roofing.

Yours very truly,
HARBERT L. KING.

This is the sort of satisfaction that will build up your business, if you will handle

Cortright Metal Shingles

because you will always be recommended by satisfied customers, and attractive, durable roofs. It will pay you well to investigate our special Contractors' and Builders' proposition.

WRITE US BEFORE YOU FORGET

Cortright Metal Roofing Company

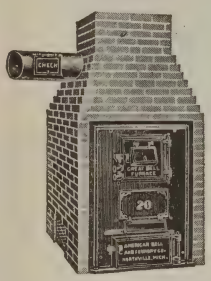
Philadelphia and Chicago

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Fireproof Metal Windows
Skylights, Ventilators
Sheet Metal Goods

Send for Catalogue No. 6

Willis Manufacturing Co.
Galesburg, Ill.



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For Less Than $50 Complete
FOR 5 AND 8 ROOM DWELLINGS

An unheard of Price and a most Remarkable and Indestructible Furnace. No Pipes—no Lost Heat.

American Bell & Foundry Co.
NORTHVILLE, MICH.

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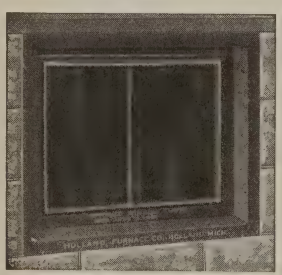
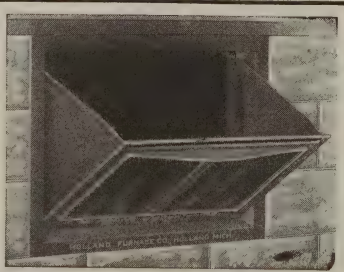


A Real Glass Window when closed, which is burglar proof

A Perfect Coal Chute
when open

LOCKS FROM OUTSIDE AND CAN ONLY BE UNLOCKED FROM INSIDE



Write for Proposition to Contractors and Builders

HOLLAND CO., Holland, Mich.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

sheet metal workers, is leading many carpenters and contractors to make a specialty of this class of work. The Edwards Mfg. Co. is giving special attention to the placing of agents in the various cities and towns and have extremely interesting propositions to make to new agents. A line to them will bring complete information as to how an agency can be secured and the extremely liberal terms offered by the Edwards Co.

"BETTER MILLWORK.."

"Better Millwork" is a trademark used by the Chicago & Riverdale Lumber Company. While this company sell direct to contractors and builders, and fill even the smallest order for building materials satisfactorily and promptly, yet it is in figuring on and selling the public buildings, fine residences and store building jobs that they have gained their big reputation.

There is a vast difference in filling and shipping an order that is plainly made out for a small amount of material and in supplying the entire millwork, lumber, etc., for a large school, city hall building or a $50,000 residence. In the latter work, the Chicago & Riverdale Lumber Company have experienced estimators who go over the blue prints accurately and give the contractor and owner what is needed and at prices which are not only very reasonable, but which are right when quality is considered. "Better Millwork" is specified for every job. When the order is filled, everything is shipped in one lot direct from their Chicago plant, so that there are no delays in waiting for different items to arrive from a dozen different factories.

This service of giving the contractor the millwork and lumber all at one time or when needed means a big saving to him. The quality of "Better Millwork" is of such a high standard that the Chicago & Riverdale Lumber Company claim a saving of 15 to 25 per cent can be made in the carpenter work alone. Everyone knows that it is a better proposition to have the millwork arrive properly made in the first place than to have to practically re-manufacture it on the job. This does not mean either that "Better Millwork" would cut any carpenter out of a single hour's work. While it is true "Better Millwork" takes less time and trouble to put in a building, yet the quicker a contractor finishes up a job, and the better it is, the more the property owners will want that particular contractor to do their work. The more good paying jobs the contractor lands, the more work there will be for the first-class carpenter.

So it is worth while to send in the plans on a job or two to the Chicago & Riverdale Lumber Company, 13537 Indiana avenue, Chicago, Ill., and not only get their figures, but better yet, try them out on an order.

They do not claim to make it a point to try to meet the cheapest prices quoted by others on a job, but they do claim that their "Better Millwork" and lumber are so good in quality and grades that their figures will prove

Architectural Detail

shows up at its true value only when the proper system of lighting is employed.

For large interiors like the Pabst Harlem Restaurant in New York City (shown above), Semi-Direct Lighting by the "Frink" System gives the most efficient, artistic and economical illumination. It provides an exceptionally soft, evenly diffused light which adds class and distinction to the architectural details.

"FRINK" SYSTEM OF ILLUMINATION

has demonstrated its superiority in many of the more recent installations of world-wide importance, and together with the well-known J-M Linolite System of Electric Lighting embodies the highest perfection in art, efficiency and quality.

We design and execute special lighting effects of every description.

Write us your requirements and we will promptly submit data and estimates.

H. W. JOHNS-MANVILLE CO.

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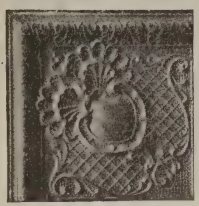
STEEL CEILINGS



Are you figuring on using a medium priced Steel Ceiling? Get our catalog by all means. It shows a line of beautiful ceilings of sufficient variety to please almost any individual liking, yet at prices surprisingly low.

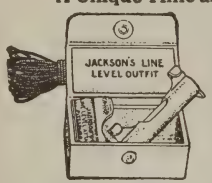
The possession of this catalogue and a knowledge of our line and prices will save you many a dollar if you are an occasional or frequent buyer of Steel Ceilings.

Write for It Today

INDIANAPOLIS CORRUGATING CO.
Indianapolis, Indiana

THE JACKSON ALUMINUM LINE LEVEL

A Unique Time and Labor Saving Device

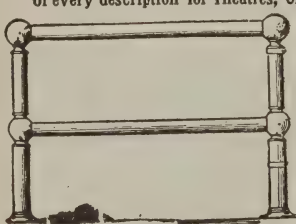


It takes the place of the old-fashioned sixteen-foot straight edge, yet it can be carried in your vest pocket. ¶No contractor, builder, carpenter, mason, bricklayer, architect or plasterer should be without one. ¶Just stretch your line and hang the level on it—it's positively accurate. ¶The complete outfit is put up in a neat leatherette case and consists of the level with a 40-ft. line, also a spring clamp for attaching the level to a steel square or pocket rule, thereby serving as a plumb rule or bench level. At your hardware dealer's or sent for $1 postpaid.

JOS. WOODWELL CO., Sole Agts., 201-203 Wood St., Pittsburgh, Pa.
Write for Catalog of Woodworker's Tools

BRASS RAILS

Of every description for Theatres, Churches, Offices, Etc.



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BRASS FRAMES
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For Theatre Lobbies.

LET US BID ON ALL BRASS WORK

Inducing Prices, High Class Workmanship. Send us list of requirements.

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TO KEEP OUT DAMPNESS

Paint Your Concrete and Brick Buildings with TOCH BROS.

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"Remember It's Waterproof"

and your cement floors with **TOCH BROS. Cement Filler** and **Floor Paint,** Pat'd. Proof against Water, Acid, Fumes or Alkali. **Special elastic compound for each specific purpose**

The Garden City Sand Co.
709-711 Chamber of Commerce, Chicago

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the lowest when the building is completed. They also claim that their methods of shipping and doing business have made them many friends among contractors and builders who are doing the better class of residence, store and public building work. Upon request their Catalogue No. 32 will be mailed free of charge.

A MILE OF BARRETT SPECIFICATION ROOFS.

The wonderful Bush Terminal in Brooklyn is probably the most complete and scientific harbor and railroad warehouse development in the world. It is completely modern, the oldest building dating from 1897. Among the 181 different buildings are warehouses, piersheds, factory buildings, power houses and an enormous freight structure.

These buildings, all under one ownership, stretch for a mile along the greater New York shore.

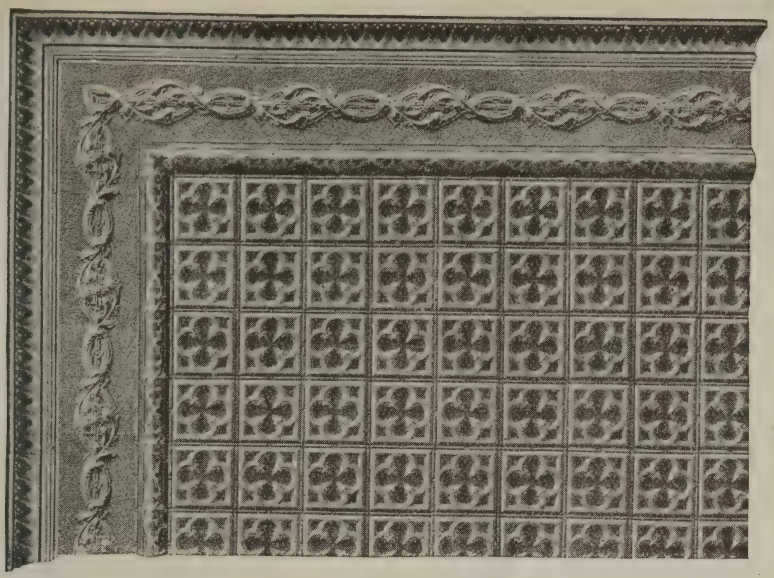
The roofing used on all of these buildings was, after the most careful consideration, that of the Barrett Specification type. The entire area covered was more than three million square feet, or a little over seventy acres.

The Barrett Manufacturing Company, with offices in New York, Cleveland, New Orleans, Chicago, Pittsburgh, Philadelphia, Cincinnati, Seattle, Boston, Kansas City, St. Louis, Minneapolis and London, England, will send a bird's eye view of this Terminal, showing this magnificent enterprise in great detail to those who are interested, and will also include a copy of the famous "Barrett Specification."

PITSBURGH STANDARDIZED REINFORCEMENT.

Under the above title the Pittsburgh Steel Products Company, Pittsburgh, Pa., have prepared a Blue Book containing information and tables relative to the use of Pittsburgh Standardized Reinforcement for concrete. This book is prepared to enable engineers, architects and builders to design concrete structures in accordance with sound theory and the best practice, and without laborious mechanical complications. The girder, beam and slab tables have been computed so that under dead and live loads, and figured on the basis of the "straight line formula," the tensile strength of the steel will not exceed 16,000 pounds per square inch, and the compressive stress in the concrete will not exceed 650 pounds. The tables have been prepared by using formulas recommended by a joint committee on concrete, composed of members of the American Society of Civil Engineers, American Society of Testing Materials, American Railway Engineering and Maintenance of Way Association and the Association of American Portland Cement Manufacturers.

The data is presented with a special reference to materials manufactured by the Pittsburg Steel Products Company, although it is by no means a catalogue especially for that concern. The shapes used are the standard sections generally used in work of this char-



Edwards Metal Ceilings and Walls

CARPENTERS CONTRACTORS AND BUILDERS

Here is a chance for you to build up an independent, profitable business for yourself right at home. Many agents are now devoting their entire time to selling our Metal Ceilings. Others have made big profits simply devoting part of their time to selling and applying our Metal Ceilings and Walls. *Write us to-day about your territory.* Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that some one else will be given your territory. *Don't delay. Write today for our special agents' proposition and large, handsome catalog of attractive designs.*

The Edwards Manufacturing Company

"The Sheet Metal Folks"

430-450 Eggleston Avenue, Cincinnati, Ohio

Largest Manufacturers of Metal Ceilings, Metal Shingles, Steel Roofing and Siding in the World

Eastern Representatives: The W. H. Daycock, Jr., Co., 81-83 Fulton Street, New York

Branch Office and Warehouse: 1625-1627 Pacific Avenue, Dallas, Texas. J. F. Agnew, Manager

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With Instantaneous Readings can be used at all times and under all conditions with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catalogue No. 12.

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ARCHITECTURAL DRAWING MADE EASY

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SLATE BLACKBOARDS Guaranteed Strongest and Best Finish.

Pamphlet with setting instructions on application.

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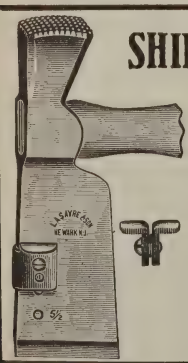
WITH POSITIVE GAUGE

No. 144



OVAL HEAD. 169 POINTS.

Gauges by ¼ inches from 4¼ inches to 5½ inches. Full Polished Solid Tool Steel, the best Quality ever used in a Hatchet.

If your dealer does not carry these Hatchets we will send you one, express prepaid, upon receipt of $1.75.

L. A. SAYRE & SON

340 Mulberry St., NEWARK, N. J.

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acter as well as special shapes rolled by this company.

This book of 400 pages contains such a vast amount of concrete information that we believe every reader of THE NATIONAL BUILDER should send for a copy. We understand that the mention of THE NATIONAL BUILDER will secure a copy without cost.

PHENIX REVERSIBLE WINDOWS.

Facilities for cleaning windows are just as important as closing them, but few builders recognize the need, as window washing and repairing is not generally included in their contract or accomplishments.

The Phenix Mfg. Co., Milwaukee, Wis. have perfected a window frame and sash in which the entire frame is hinged to swing in, thus obviating the necessity for going outside or even leaning out to clean or repair

the glass or sash. The device is made in a number of styles and sizes, of which we show one designed for a balcony window. This style has all the appearance of a double hung sash with the added convenience of a door.

The many advantages of windows of this construction will be apparent to most of our readers, but the Phenix Co. have so many styles of this device that their complete circulars should be obtained.

HERRING BONE EXPANDED METAL LATH.

The rapidly increasing use of metal lath brings up so many questions concerning details and methods of construction that the General Fireproofing Co., Youngstown, Ohio, have prepared a booklet, more of a handbook for the use of the architect, contractor and builder who wants to build his work right,

Genasco

THE TRINIDAD-LAKE-ASPHALT

Ready Roofing

You can't expect "dead" roofing to give you real service.

Genasco Roofing has life that comes from Trinidad Lake Asphalt. Life makes it resist sun, wind, rain, heat, cold and fire.

Genasco gives lasting protection.

Comes in rolls ready to lay. Mineral or smooth surface. Ask your dealer for Genasco. Write us for samples and the Good Roof Guide Book—free.

The Kant-leak Kleet, for smooth surface roofings, prevents nail-leaks and makes seams water-tight without cement.

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Largest producers of asphalt, and largest manufacturers of ready roofing in the world.

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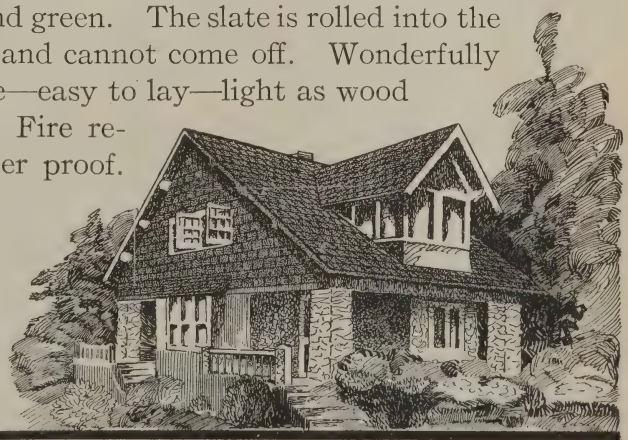
Here is a roofing that is going to appeal to the practical man of artistic tastes—

Winthrop Asphalt Shingles

Made of solid asphalt—and tapered. The exposed surface is of fine chipped slate in natural colors of red and green. The slate is rolled into the asphalt under heavy pressure and cannot come off. Wonderfully rich effect—extremely durable—easy to lay—light as wood shingles and as low in cost. Fire resisting and absolutely weather proof.



WRITE TODAY FOR YOUR
Sample, it's ready for you

Winthrop Asphalt Shingle Co.
10 61ST STREET ARGO, ILLINOIS

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

A NAT. BUILDER

than as an advertisement of their Herring Bone Expanded Metal Lath. Besides containing many photo-engravings of the prominent buildings in which this lath has been used, the booklet contains explicit directions, illustrated, showing how the work should be put up for various classes of walls, partitions, ceilings, etc.

Particular attention is paid to the point that partitions made in this manner are fire-proof, and so retard the spread of flames, while adding to the comfort and appearance. It is shown that the cost is but slightly more than that of frame construction and considerably cheaper than solid brick.

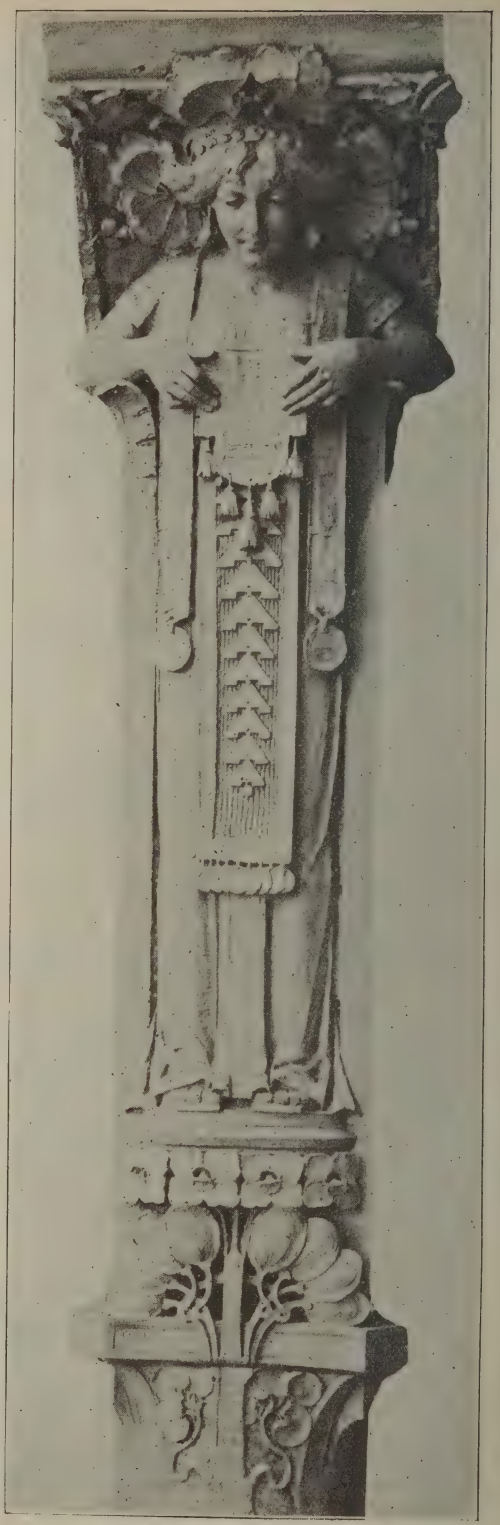
This booklet is sent free on request to the General Fireproofing Co., Youngstown, Ohio.

ORNAMENTAL TERRA COTTA CO.

In the manufacture of ornamental terra cotta, the greatest care must be taken in the selection and preparation of materials, as well as in the design and manufacture. Careful consideration must be given to the action of the plastic materials when in the kiln, as well as for the structural detail, to permit their being set in place. The slight variations in the sizes of the adjoining pieces are not susceptible to correction as easily as stone or concrete, so that the greatest care must be exercised throughout in order to produce terra cotta which shall properly convey the artist's idea of life with the architect's or engineer's design of the building.

The Northwestern Terra Cotta Co., 2525 Clybourn Ave., Chicago, Ill., have for many years been engaged in the manufacture of architectural terra cotta. Their experience in this line enables them to accurately interpret the architect's sketches and work them up into pleasing detail and decoration. A specialty of this company is in their enamel work. This form of terra cotta possesses advantages over the former methods of manufacture, as it presents a bright, smooth, vitreous surface to the weather. Terra cotta wtih this finish withstands the action of smoke, dust and dirt far better than the porous and dull finish materials. For this reason we see it used in many of the modern buildings subjected to sulphurous smoke and other deleterious gases. This finish, also, permits a pure white surface and is especially adapted to lining light courts and air shafts, as well as the exterior of buildings fronting on narrow sides. In this way the light is reflected instead of being absorbed by the soot-covered materials.

A great many architects, contractors and builders find that they do not have the time to make sketches and detail drawings of terra cotta, and to such men the Northwestern Terra Cotta Co.'s plan of preparing working drawings from sketches appeals particularly. Their long experience in this line of work makes them particularly competent to get this out and we know that they are glad to hear from those who have work of this character in contemplation.



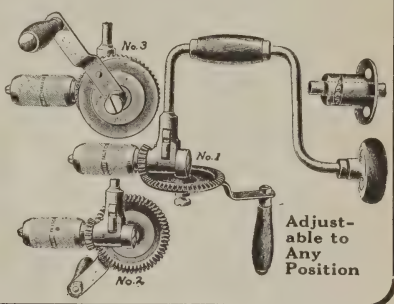
Gear Attached or Detached by Thumb Screw

This Drill Brace
No. 192
Makes Difficult Boring Easy

The gear, as shown by illustration, is attached or detached by turning a thumb screw, but what is not shown is that when set it is as rigid as if keyed on. Its possible adjustment to three positions gives the user 100% efficiency in any corner or in any position or angle.

The ratchet is an improved device, so arranged that both dogs can be thrown out of mesh at the same time, allowing free operation of drill gears.

With drill gears detached, the brace is our regular 10-inch Sweep tool with all its patented improvements—universal chuck, taking all sizes and shapes of shanks, patent ratchet, non-splitting free-acting center handle, and ball-bearing head.



Adjustable to Any Position

Of fine appearance and works perfectly

MILLERS FALLS CO.

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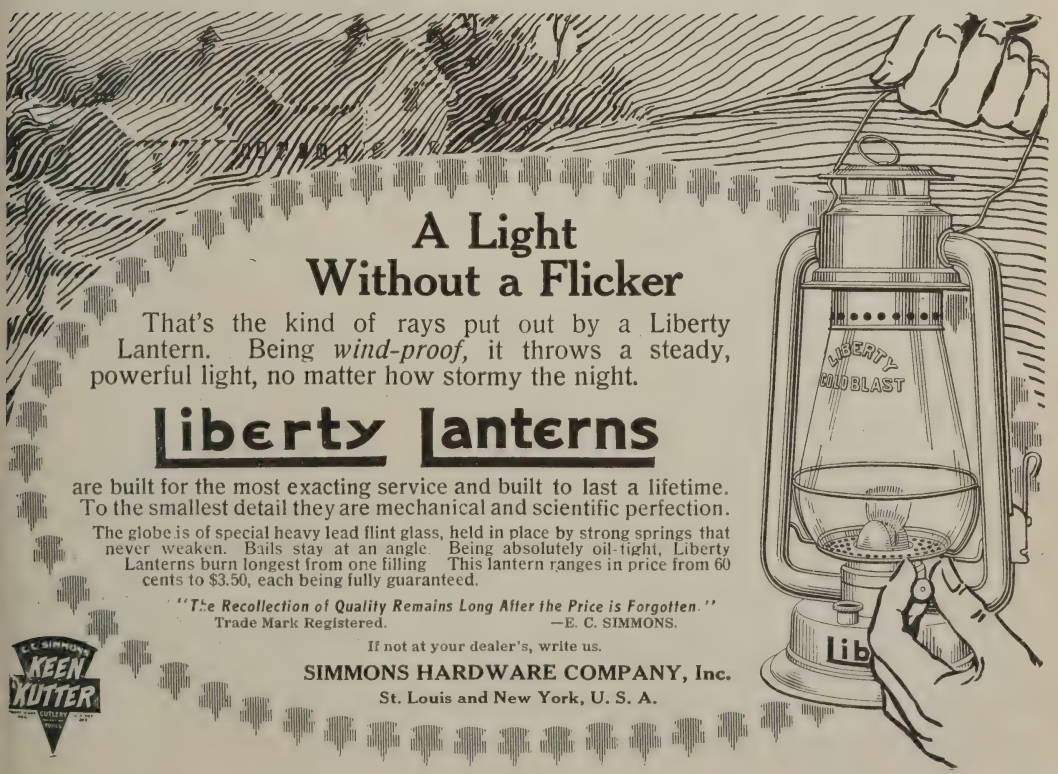


A Light Without a Flicker

That's the kind of rays put out by a Liberty Lantern. Being *wind-proof,* it throws a steady, powerful light, no matter how stormy the night.

Liberty Lanterns

are built for the most exacting service and built to last a lifetime. To the smallest detail they are mechanical and scientific perfection.

The globe is of special heavy lead flint glass, held in place by strong springs that never weaken. Bails stay at an angle. Being absolutely oil-tight, Liberty Lanterns burn longest from one filling. This lantern ranges in price from 60 cents to $3.50, each being fully guaranteed.

"The Recollection of Quality Remains Long After the Price is Forgotten."
Trade Mark Registered. —E. C. SIMMONS.

If not at your dealer's, write us.

SIMMONS HARDWARE COMPANY, Inc.
St. Louis and New York, U. S. A.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Salesmanship and Main Street

By JACK DAHLTON

HE HAD been doing a lot of the building around town for years, but his income didn't seem to be milk fed. In fact, he had just about decided that times were never so hard—that grub was becoming almost extinct for the common people, and every time he did land a job, it was a loss because so many bid on it, when suddenly this contractor found out what was really wrong.

The contractor was waiting for some groceries to be wrapped up—a salesman completely disgusted and discouraged after trying for years to sell the groceryman his line opened up thusly: "You are always yelling that you can't buy my line because the mail order people are getting all the business. Say, go outside and look at your store front and that beautiful window display. There's that thirty-year-old cat of yours curled up right now in that broken box of oranges. Say, Mr. Groceryman, it's a wonder that you have any customers at all. Why don't you fix your old junk shop up and make a real store out of it and become an up-to-date dealer? Then you wouldn't be blaming anyone for making a failure—" But here the salesman remembered about a train he just simply had to catch.

And the contractor caught the bright thought. He suddenly discovered that Main street had two sides to it. He discovered that many streets lead into Main street. He knew nearly every man that walked Main street and a lot who pattered up and down those side streets too. For the present he would stick to Main street and as he turned the matter over in his mind, he was sure he knew of others besides the grocer who needed some building work done.

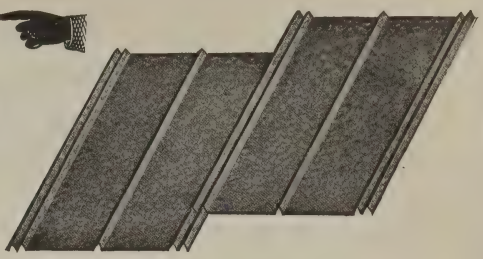
This contractor started in at once to become a salesman for his own services. He was well qualified—his reputation for honesty was good. His work was always done right and well.

His first sale was made to the groceryman, who had made up his mind that the salesman was right after all, but no one had ever told him before that a nice looking place would increase his business.

The contractor showed the groceryman a sketch of what he could do for a certain amount of money. He showed him a sample of a very narrow sash bar, which was not only beautiful to look at, but would hold the big plate glass window so well that even a sixty mile gale would not blow it out. He showed him samples of wall board which

"Justright" Galvanized Roofing

APTLY NAMED

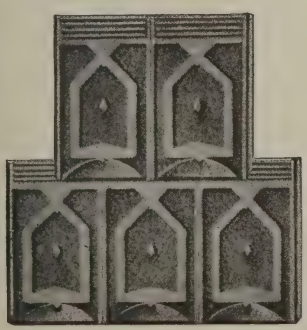


That Simple Roof That Don't Leak

¶ No Wood Strips Required. ¶ Adapted for Residences, Barns, Warehouses, Garages and buildings requiring fireproofing. ¶ Made in all lengths to meet requirements.

STANDARD Lock-Joint METAL SHINGLES

Are the **quickest laid** shingles made, Mr. Contractor and Builder, and they give absolute satisfaction and service. These are proven facts, and don't ignore them. ¶ Our metal shingles are made in either **Painted Tin or Galvanized.** They are twice as quickly applied as those of any other make. In using them you are saving time, and saving time means saving money. Can you afford **NOT** to investigate them? ¶ Our Standard Lock-Joint Metal Shingles have a continuous seal at end of side-lock. It is impossible for rain, snow or sleet to blow up under them. Ours is the only shingle made having this feature. And they lock—lock so that they will always keep in one, and only one position, contraction and expansion being provided.



Let us send you our general instruction roofing booklet. You'll find it very handy to have, and it explains all about our Standard Metal Shingles. Drop us a line about it. It's free. Further: We have an ATTRACTIVE PROPOSITION to make to Contractors and Builders in territory in which we are not represented. Write us regarding terms, etc.

The Moeschl-Edwards Corrugating Company

9th Street, Covington, Ky., (Opposite Cincinnati)

Sheet Metal Building Material, Interior & Exterior

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

could be used for partitions in making a window display. He showed him a new front door lock set. He showed him how he could rearrange the counters, fix up the shelving, and do it all without having to close up the store a single hour.

The contractor got the job at his own figure. When the work started, the local paper had to tell about the extensive repairs that the Groceryman was putting in. It told who was doing the work, too. When the job was finished, the Daily Scandal simply had to tell how nice it was. Everyone for miles around came to look at the new store and many became customers.

The furniture dealer had been watching that job. He had a talk with this contractor and asked what could be done with his store, and the contractor said he would think it over and let him know at the end of the week.

Then he went home and again got out all the back copies of THE NATIONAL BUILDER and went through them. He got in communication with more NATIONAL BUILDER advertisers. Soon the Daily Scandal told about the big improvements in the furniture store, and it also mentioned who did the work.

By this time the contractor knew that his idea was correct, so he kept on trying to hunt up real reasons why property owners needed his services. It was really surprising how this contractor found out where he could get a job, and have the contract closed up before anyone else in town knew about it. He made it his business to find out who needed a new hardwood floor, who needed an addition nailed on the house.

He found it more interesting and profitable to work up new customers than to spend his time trying to find out how low he could figure on a job that everyone else was trying to do the same thing with.

As his salesmanship improved, the size of his jobs increased, and today he has a milk fed bank account, which will keep him in eats for many years, and he has just renewed his subscription to THE NATIONAL BUILDER for the tenth year. He couldn't do without it. It keeps him in close touch with all that is good and practical in the building field. It helps him over many a technical building problem, and the supplement plans always give him a strong talking point when showing them to a prospective home builder.

He knows that Main street has many a big building possibility on it yet, and all it requires to get there is a little salesmanship.

Amatite ROOFING

How to Sell Amatite

HERE is the argument that sells Amatite to the consumer. Imagine yourself using it and see how effective it is:—

"Yes, I can sell you the ordinary 'rubber' roofings, but of course you will have to paint them every two years to keep them in good order. Amatite has a mineral surface and *needs no painting*. You just lay Amatite on your roof and leave it alone. It takes care of itself.

"Amatite weighs twice as much as the other roofings and that means you get twice as much density per foot, and that means durability. Amatite is easy to lay; the nails and cement are supplied free. The price is no higher than a first class painted roofing and you save all the cost of paint in the future.

"Amatite is made by the biggest company in the roofing business. They couldn't afford to make anything but the best."

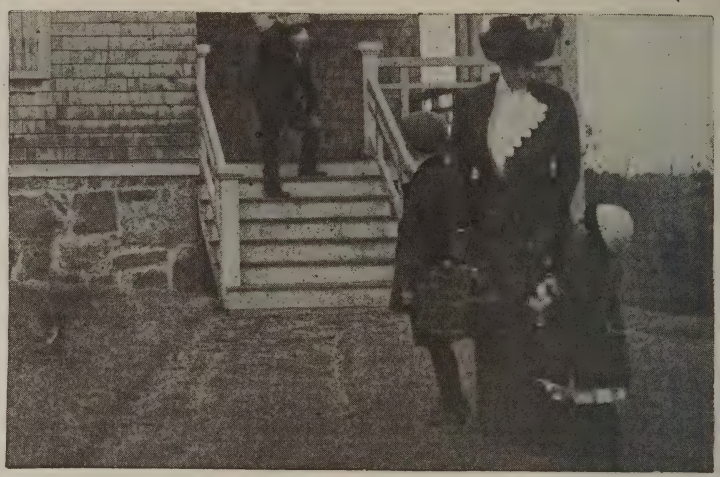
These are the kind of arguments that sell goods. Any sensible customer will see the points as soon as the facts are presented. Sample and booklet on request to nearest office.

Barrett Manufacturing Company

New York, Chicago, Philadelphia, Boston, St. Louis
Cleveland, Pittsburgh, Cincinnati, Kansas City, Minneapolis
New Orleans, Seattle, London, Eng.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE FORECLOSED MORTGAGE OR THE



TRAVELERS

IF YOUR home is mortgaged, it must worry you at times to think what might happen if you should die and your wife and children were left without the means to pay the principal or even to meet the interest payments as they come due. How could your family prevent the loss of the home and the humiliation of being turned out under foreclosure?

End your worry and protect them by placing the responsibility on The Travelers by a Life Insurance Policy which at your death will pay off the mortgage and provide in addition a fund for purchasing the necessities of life. One of our Guaranteed Low Cost Life insurance policies for an amount proportionate to your means will do this, or a Monthly Income policy will meet the interest payments and provide each month a certain income for the family.

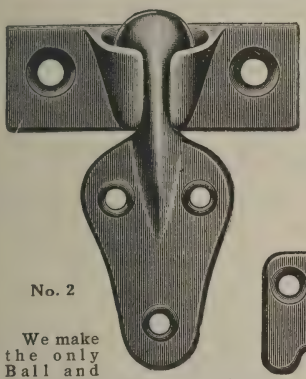
Send to **The Travelers Insurance Company, Hartford, Conn.,** for particulars. We will show you how to do it.

The Travelers Insurance Company, Hartford, Conn. TEAR OFF

Send particulars. My name, address and date of birth are written below.

NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

STORM SASH AND SCREEN HANGER Nos. 1 and 2



No. 2

The time is drawing near at hand when carpenters and builders begin putting up storm sash and it might be well to say that the best and most convenient goods are always the cheapest in the end.

We make the only Ball and Socket Hangers on the market. One trial will convince you that they are the best.

No. 1

Our No. 1 Fastener is made of the best steel wire. It holds the sash firmly against the blind stop and prevents rattling.

Manufactured by the

Diehl Novelty Company, SHEBOYGAN, WISCONSIN

Send for Catalogue

CONCRETE BOOKS

Popular Handbook for Cement and Concrete Users. A Concise Treatise of the Principles and Methods Employed in the Manufacture and Use of Concrete and Its Products in all Classes of Modern Works. By Myron H. Lewis, C. E., author of "The Waterproofing of Concrete." "Manual of Examination for Civil Engineers," etc. Illustrated, 500 pages.....$2.50

Reinforced Concrete. A Manual of Practice. By Ernest McCullough, M. West. Soc. Engrs. 136 pages, illustrated. The theory of the design of reinforced concrete structures in a clear and simple manner. Condensed with original matter. Invaluable to every concrete engineer or contractor. Cloth.....$1.50

Concrete and Reinforced Concrete Construction. By Homer A. Reid, Assoc. M. Am. Soc. C. E. 906 pages, 715 illustrations, 70 tables. A combination of several books containing the latest data from different theory and principles. Will probably be an authority for many years.....$5.00

Taylor-Thompson. A Treaties on Concrete, Plain and Reinforced; Materials, Construction and Design of Concrete and Reinforced Concrete; with chapters by R. Feret, William B. Fuller and Spencer B. Newberry. By Frederick W. Taylor, M. E., and Sanford E. Thompson. S. B., M. I. T., M. Am. Soc. C. E., Mem. Am. Soc. for Testing Materials. 589 pages, 176 figures. Complete data on materials, design, principles, etc., in all kinds of concrete work. A valuable book on concrete construction.....$5.00

Postpaid, at These Prices

Hodgson Book Company

539 S. Dearborn St., Chicago

"Hey You! Don't You Know Any Better Than That?"

OF course, he doesn't or he wouldn't be where he is—he wouldn't be doing manual labor at small pay and stand for being bullied around by the boss. Men who do stand for this sort of thing neglected their opportunities—they didn't realize that they needed something beside brawn to get ahead in the world. ***Brains*** count for more than brawn, and ***training*** plus ***brains*** will place you in a position where ***you*** will be boss instead of bossed, where ***you*** can do the ordering and the other man the work, where ***you*** will ***get the money*** for what you know, not for what you do.

How you can get the training you need

The ***American School of Correspondence*** was established fifteen years ago for the benefit of ambitious men everywhere. The ***American School*** makes it possible to obtain an education without leaving home or giving up work. The ***American School*** brings a college course and special training to you right in your own home, no matter where you live. It will train you in any branch of Engineering, Business and Law or prepare you for entrance into any resident college.

Write us now, while the subject of self-betterment is uppermost in your mind. Tell us how far you went in the public schools, what you are doing now and what you would like to be. We'll give your case special attention—help you decide on the best course. Check the coupon and mail it now, before you forget it.

American School of Correspondence

CHICAGO, U. S. A.

This is Your Opportunity

Check the course you want and mail the coupon now

American School of Correspondence, Chicago, U. S. A.

Please send me your Bulletin and advise me how I can qualify for the position marked "X." Nat. Bldr. 8-12

.....Automobile Operator	.....Lawyer
.....Draftsman	.....Fire Insurance Eng'r
.....Architect	.....Telephone Expert
.....Building Contractor	.....Moving Picture Op'r
.....Structural Engineer	.....Book-keeper
.....Civil Engineer	.....Stenographer
.....Electrical Engineer	.....Accountant
.....Elec. Light & Power Supt.	.....Cost Accountant
.....Master Mechanic	.....Cert'f'd Public Acc'nt
.....Sanitary Engineer	.....Auditor
.....Steam Engineer	.....Business Manager
.....Reclamation Engineer	.....College Preparatory

NAME .....

ADDRESS .....

OCCUPATION .....

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

FRONT ELEVATION

The Bar that Stands the Test

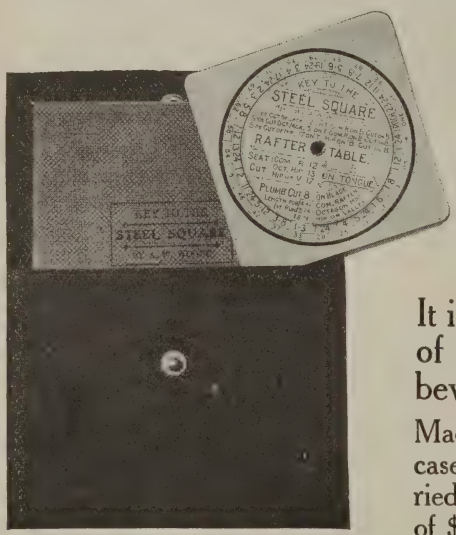
Thousands of merchants are putting in the new style of store front each year. When you are called upon to specify the right bar, you can pin your faith on the "PETZ".

Petz Bars have stood the test and won the approval of thousands of leading architects and builders because they have the **strength,** because they are **safe,** because they are **easy to install,** and because they **positively will not break glass.** Insurance companies allow the lowest rates where **Petz Bars** are used.

Our booklet on "Metal Store Front Construction" contains **FACTS** that you should **KNOW** and have at your hand for **READY REFERENCE.** Write for a copy **now.**

DETROIT SHOW CASE CO.

481 Fort Street West **SOLE MAKERS** **DETROIT, MICH.**



Wood's Key
TO THE
Steel Square

Has been tried by thousands of Builders and not found wanting. It is a wonderful instructor as to the uses of the square in obtaining cuts and bevels for all kinds of work.

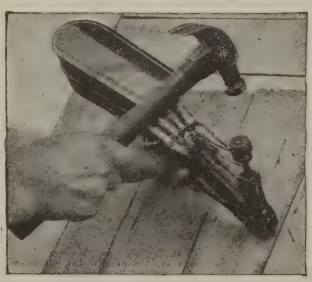
Made of celluloid and put up in neat leather case of pocket size so that it can readily be carried on the job. It is a snap at our low price of $1.50.

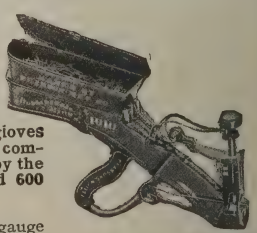
Send your order at once and it will be shipped prepaid to your address

Hodgson Book Co.

537 South Dearborn Street **CHICAGO**

PEARSON'S AUTOMATIC SHINGLE NAILER





Pays For Itself on One Fair-sized Shingling Job

Works well on roofs of any pitch. You can wear gloves or mittens and drive nails faster and with more comfort than the old way. Just throw the nails in by the handful (Nailer holds easily between 500 and 600 nails in the top), and start nailing.

PEARSON NAILERS are made in two sizes.

The Blue Nailer is for common 3d, No. 14 gauge wire nails, and the Red Nailer is for the **galvanized** 3d, No. 13, 1¼ in. wire nails. Order from your dealer or send **$5.00** for either one—express prepaid. Money cheerfully refunded if Nailer is not as represented. *Write for Circular "N"*

PEARSON MFG. CO. **ROBBINSDALE, MINN.**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

WHEN YOU GET TO **SASH CORD use SILVER LAKE**

and insist upon getting it from your dealer. To insure you against substitution, we stamp our name upon every foot of our cord. Carried by all dealers.

SILVER LAKE BRAIDED SASH CORD was originated by us, and for forty years has been recognized as **THE STANDARD**

Established 1869

No. 29
Richards Gem

We make a hanger for any door that slides.

Let Us Solve Your Hanger Problems!

Richards-Wilcox Trolley Hangers are the result of our thirty years of hanger making experience.

The shape of track, trucks, wheels and pendants shows our careful study of your customers' requirements. Don't experiment, get the goods with a backing—a knowledge behind their make.

Sold by the Hardware Trade

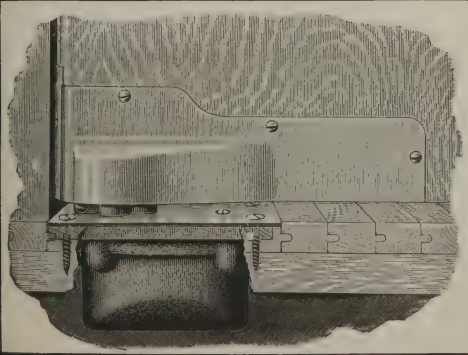
RICHARDS-WILCOX R&W CO. AURORA TRADE MARK

This trade mark should be your guide to placing hanger orders.

Have you catalogs?

Richards-Wilcox
MANUFACTURING CO.
AURORA, ILL. U.S.A.

Door Hangers and Hardware Specialties



Standard Checking Hinge

A Checking hinge for double-acting doors between dining room to pantry or kitchen, etc.

It is a door check and hinge combined.
It automatically closes the door without a slam.
I prevents children from being knocked down.
It prevents injury to hands if caught when door is closing.
It stops door exactly at center.
It holds door open automatically when desired.
It renders the action of door absolutely noiseless.
It will outwear three of the spring hinges now in common use.

For Sale by Hardware Dealers

THE STANDARD MFG. CO., Shelby, Ohio, U.S.A.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

ÆTNA-IZED?

WHY NOT BE ÆTNA-IZED WITH A TEN DOLLAR BILL

Ten Dollars will insure you for one year under the famous

ÆTNA TEN DOLLAR COMBINATION

In extent and variety of protection without a rival. For $10 this policy pays

$2,250.00 for death from travel or burning building accident

1,250.00 for death from ordinary accident

250.00 for death from natural causes. Paid at once upon receipt of certified copy of official certificate of death.

It also pays liberally for loss of limb or sight, and provides weekly indemnity for accidental injury that results in total or partial disability. The payments for accidental loss of life, limb or sight increase each year without additional cost, and make a possible payment of $3.250.00.

$3,250.00 Insurance for $10.00

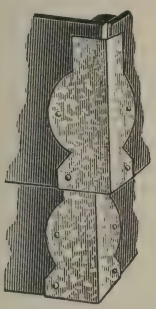
Send in the coupon to-day

Ætna Life Insurance Co. (Drawer 1341) **Hartford, Conn.** Tear off

I am under 65 years of age and in good health. Tell me about ÆTNA Ten Dollar Combination. My name, business address and occupation are written below.

NAT BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

More Profit For You.



You can now give your customer the popular mitre-corner effect without the slow, careful work of cutting and fitting bevels.

Use Metal Building Corners

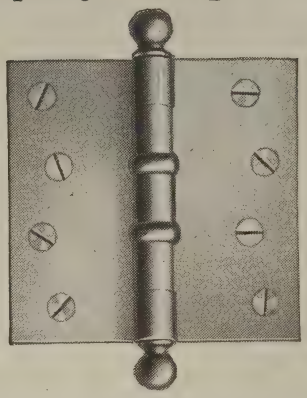
They take the place of corner boards. Save fully $2 worth of time in finishing each corner, make a stronger and neater job.

WRITE FOR FREE SAMPES TODAY.

F.D. KEES MFG. CO. BEATRICE, NEB Box 811

If you've never used Gossett Hinges for full length window screens, say so and we'll send you a sample pair free.

Properly Hung Doors



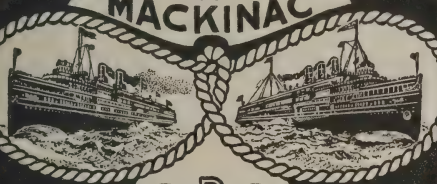
which will open softly and smoothly, without friction, can be obtained by using

STANLEY'S
Ball Bearing Hinges
with non-rising pins

Write for Circular "N." It tells the whole story.

THE STANLEY WORKS
NEW BRITAIN CONN.

THE COAST LINE TO MACKINAC



D & C LAKE LINES

DETROIT CLEVELAND BUFFALO NIAGARA FALLS

TOLEDO PT. HURON GODERICH ALPENA ST. IGNACE

THE CHARMS OF SUMMER SEAS

Spend your vacation on the Great Lakes the most economical and enjoyable outing in America.

Daily service is operated between Detroit and Cleveland, Detroit and Buffalo; four trips weekly between Toledo, Detroit, Mackinac Island and way ports; daily service between Toledo, Cleveland and Put-in-Bay.

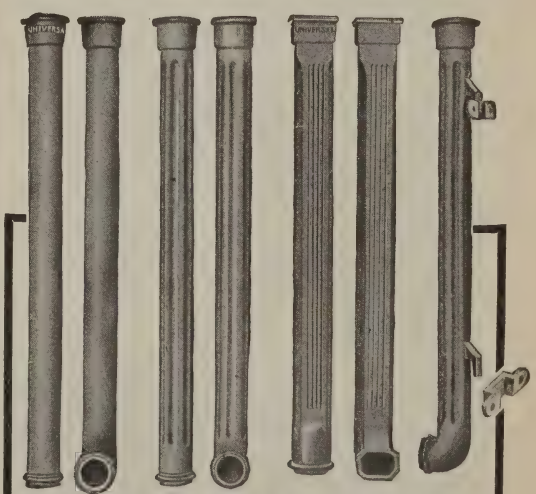
A Cleveland to Mackinac special steamer will be operated two trips weekly from June 15th to September 10th, stopping only at Detroit every trip and Goderich, Ont., every other trip.—**Special Day Trips Between Detroit and Cleveland, During July and August.—Railroad Tickets Available on Steamers.**

Send 2 cent stamp for Illustrated Pamphlet and Great Lakes Map.

Address: L. G. Lewis, G. P. A., Detroit, Mich.

Philip H. McMillan, Pres. A. A. Schantz, Gen'l Mgr.

Detroit & Cleveland Navigation Company



"UNIVERSAL" Cast Iron Conductor Connections

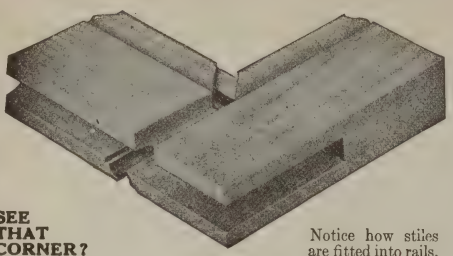
—and Boots. The kind that never rust—that last as long as the building—that permit the maximum length of service from the whole conductor pipe.

Fit all standard conductor pipe, are easily fitted, and can be removed and replaced by one man without injury to walls. Write for Circular No. "A-5"

Don't you want our booklet "B 5" on our line of Builders Supplies—sidewalks, doors, coal chutes, etc.

THE CANTON FOUNDRY & MACHINE CO., CANTON, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



SEE THAT CORNER?

Notice how stiles are fitted into rails.

MADE TO ORDER

Fly Screens and Screen Doors

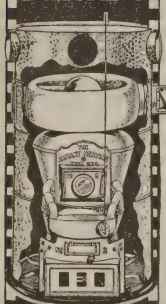
We use the best grades of wire, black enamel, galvanized, pearl and copper bronze, fastened by the improved **Standard Shoulder Strip Method,** which makes the wire drum tight and firm, can not sag or pull away.

Dealers, Carpenters, Contractors and Builders, write for a free copy of our 1912 illustrated catalog

STANDARD SCREEN CO., 1848-50 W. 14th Street **Chicago, Ill.**

Our screens are all mortised, tenoned, joined with waterproof glue and pinned with steel pins, will last a lifetime

Specify the Jahant Down Draft Furnace



Write for Terms and Free Furnace Handbook

OUR SERVICE DEPARTMENT

will cooperate with any Builder, Contractor or Architect who wishes to specify or install a dependable heating equipment. The **Jahant Down-Draft Furnace** solves the heating and ventilating problem for residences, schools, hotels, churches, and similar structures. Our 365 day "Guaranty Bond" given with every furnace insures absolute satisfaction. Send us details, sketches or blue prints of the building to be erected, and we will furnish without cost special plans, specifications and blue prints of a

JAHANT
DOWN-DRAFT
FURNACE

guaranteed to furnish plenty of heat at a minimum cost for fuel. If you include the Jahant in your finished plans we will pay freight on the complete shipment of furnace, pipes, registers, all fittings and the necessary tools.

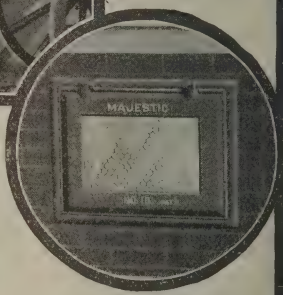
Write for our free Specification Hand Book. It tells more about the Jahant and our co-operative plan.

THE JAHANT HEATING CO.
90 Mills St., AKRON, OHIO

Furnace Builders for over 30 Yrs.

MAJESTIC FOUNDATION COAL CHUTE

¶ Protects the building just where most needed—above the opening. ¶ The heavy steel hopper catches all the coal.



¶ When not in use, the hopper lies in the bottom of the chute body. ¶ The door locks automatically either open or closed. Strictly burglar-proof. ¶ With ¼ inch wire glass or steel panel in door.

Write for circular and address of nearest dealer

Majestic Furnace Co.
70-74 Erie Street Huntington, Indiana
Chicago Office: 1102 Monadnock Block

KOLL'S PATENT **Lock Joint Columns**

Hot Off the Press

Our trade bulletin No. 1 containing valuable information for the Architect, Woodworker and Builder. All the information you need regarding wood columns. This is free for the asking.

THEY CANNOT COME APART

HARTMANN-SANDERS COMPANY

Main Office and Factory, 2155 ELSTON AVENUE, CHICAGO
Eastern Office, 1123 BROADWAY, NEW YORK CITY

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Recessed Steel Medicine Cabinet

MEDICINE
HESS SANITARY LOCKER
CABINET

The Only Modern, Sanitary, STEEL Medicine Cabinet

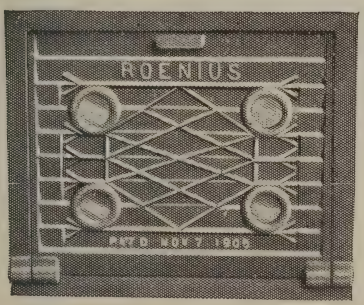
or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves. Costs Less Than Wood.

Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned. Should Be in Every Bath Room. Four styles—four sizes. To recess in wall or to hang outside. Send for illustrated circular.

HESS, 907 L Tacoma Bldg., CHICAGO

Makers of Steel Furnaces. *Free Booklet.*

The Outside Steel Cabinet



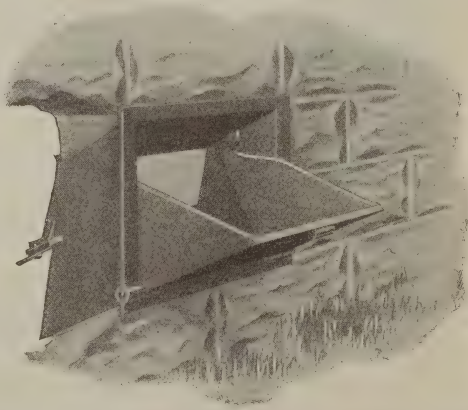
Roenius Wood and Coal CHUTES

Have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed.

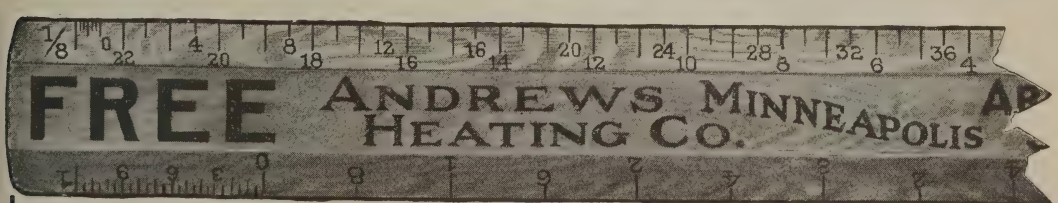
Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked.

Roenius style B Chutes are made with glass discs—and this chute is used especially in cases where the only available light must pass through the coal chute.

Ask your dealer for the Roenius—and get the best. Write for Circulars and Prices.



GRAND RAPIDS FOUNDRY COMPANY
MANUFACTURERS
Grand Rapids, WISCONSIN



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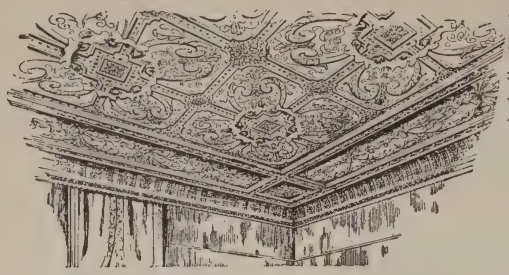

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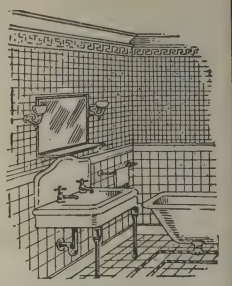

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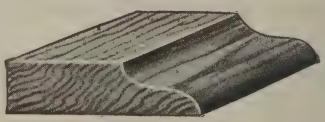

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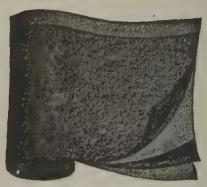

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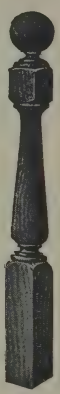

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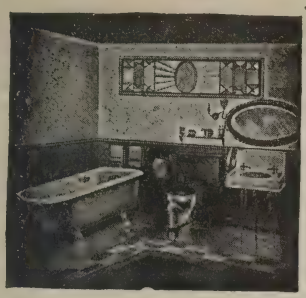

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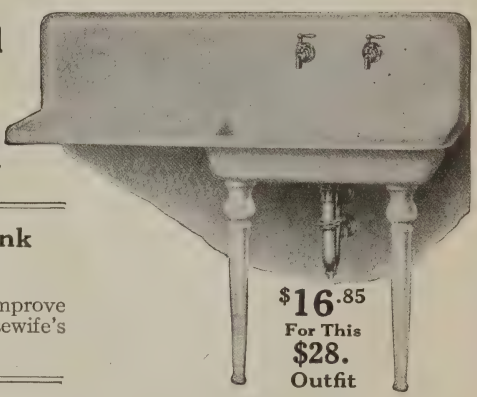

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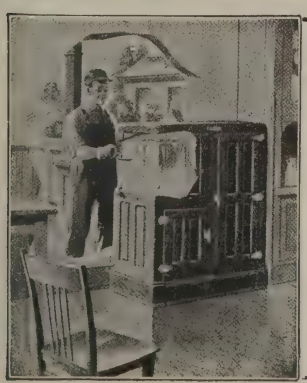

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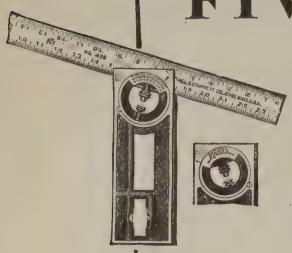

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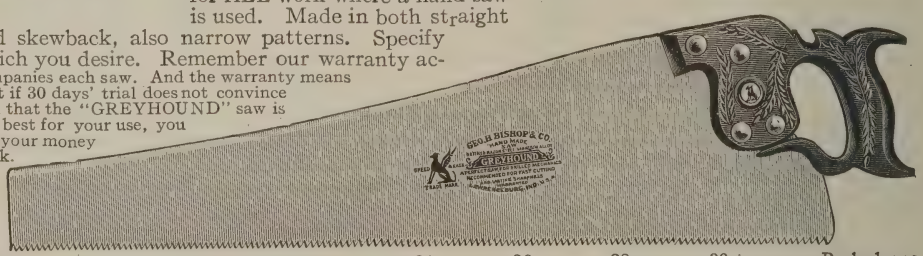

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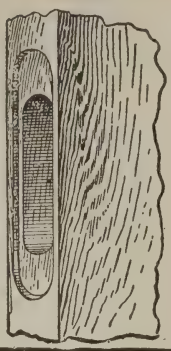
Showing lock mortise cut, including face plate setting

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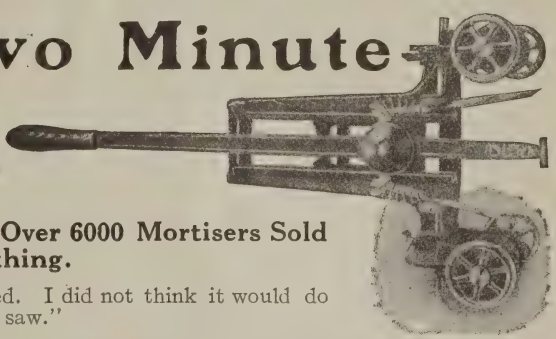

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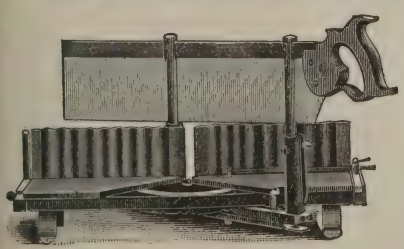

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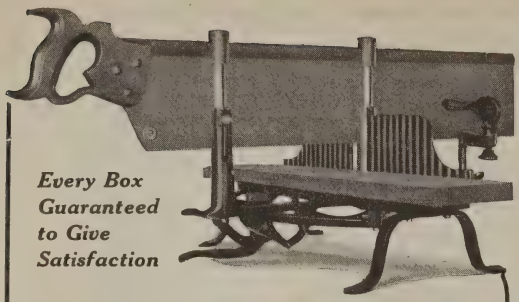

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CROWN TOOL MFG. CO.
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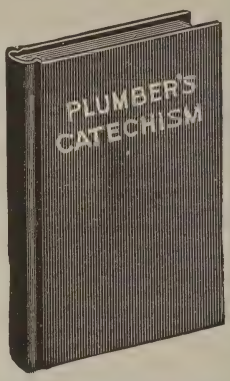
Plumbing-Catechism



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Theory and Practice of Plumbing Design. By Charles B. Ball, M. Am., Soc. C. E., and M. Am. Soc. Inspectors of Plumbing and Sanitary Engineers, and Herbert T. Sherriff, A. B., some-time editor of "Domestic Engineering," M. Am. Soc. Inspectors of Plumbing and Sanitary Engineers. Bound in cloth; 6¾x4¾ in., 100 pages; elaborately indexed.

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This book is thoroughly original; every cut is new and specially made for it. One new feature which will commend itself to mechanics is the absence of reference letters on the illustrations, therefore the reader will have no trouble in looking for the various A, B, C's, etc., which are sometimes confusing to beginners.

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These imitations are similar in appearance, but lack that quality that has made the FORD famous for Quality Excellence.

These imitations are claimed to be exactly the same as the genuine. This is untrue.

They are the same in appearance only. They will not do the work—and will not wear as long as the genuine FORD, as mechanics who have tried them will vouch.

Every genuine Ford Bit has the name FORD stamped on the stem. Unless it is there the Bit is positively an imitation.

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It pays to insist on the genuine—as thousands of mechanics know—and if your dealer will not supply you, write us and we will see that you are supplied.

Neat memo. book and circulars free for the asking. Address Dept 2E.

Ford Auger Bit Co.
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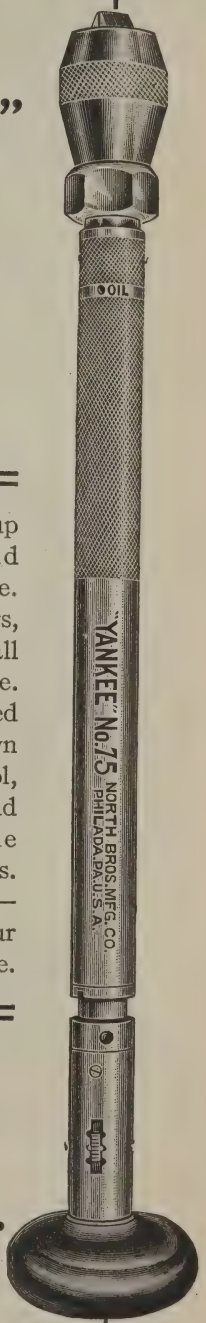
Another New "Yankee" Push Brace No. 75



Drives Wood Augers up to ⅜-in. easier and quicker than a Bit Brace. Drives or draws screws, and takes all the small tools used in a bit brace. A fine tool for crowded corners. Bearing down on handle drives the tool, giving it the quick and easy motion of the "Yankee" Spiral Drivers. Built for good service—it's a "Yankee." Let your dealer show you one.

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HOME LOVERS OUGHT TO KNOW
the HOME BUILDING FACTS that
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THEY ARE FREE. WRITE US TONIGHT

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"The Wood America Is Mostly Built Of"

Learn WHY America IS mostly built of White Pine. It's *well worth your while* to learn—*now*—*why* WHITE PINE (and its half-brother, NORWAY PINE) gives the best value for your money—whether you are going to *build* a home, *repair* the home, or use lumber for *any* purpose.

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(We don't sell it as an association.)

NORTHERN PINE Manufacturers' Association

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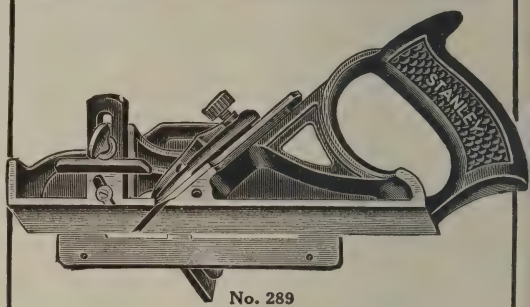
Some builders buy a Dumb Waiter Outfit and then build the enclosure to fit it. Others build the enclosure and then build or buy the Dumb Waiter to fit the enclosure.

The Sedgwick Machine Works carry in stock catalogue sizes of Dumb Waiter and Hand Power Elevator Outfits for prompt shipment (within twenty-four hours of receiving order) and make up promptly special sizes when stock sizes cannot be used. They sell complete outfits or any dumb waiter material wanted and every builder should keep their catalogue for ready reference, as it contains much valuable information resulting from their fifty years' experience as specialists in Dumb Waiters and Hand Power Elevators. Catalogue "K" sent free on request to Sedgwick Machine Works, 130 Liberty Street, New York.

Stanley Tools



No. 289

Skew Cutter Filletster and Rabbet Plane

THIS Plane has been on the market only a short time, but has already found its way into many Carpenters kits.

It is an exceptionally fine Filletster Plane. The cutter is extra wide, and being set on a skew will make a very smooth, clean cut.

An adjustable spur is fitted to each side, permitting it to be used for working across the grain.

It is so constructed that the fence and depth gauge can be attached to either side of the Plane, making it suitable for either right or left hand work. The fence is adjustable and and slides under the bottom, thus regulating the width of the cut.

To work same as a Rabbet Plane, remove the arms and the fence.

The handle and main casting are in one piece and neatly japanned. The cutter is made of a high grade of steel, tempered and ground by an improved process and honed ready for use.

No. 289.—8½ in. long; 1¾ in. Cutter
Weight 3¾ lbs.

List each $1.75

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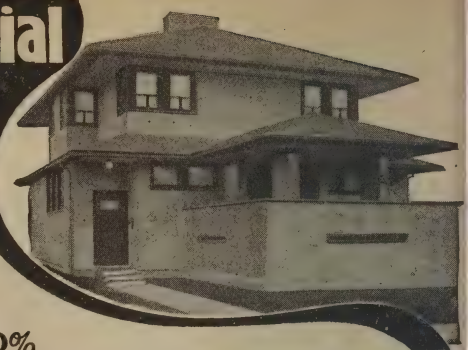

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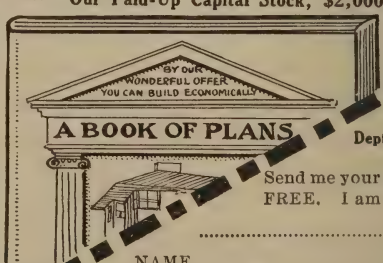

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WHETHER you are in the market for flooring right now or not, send for this valuable flooring book—and find out all the facts about this remarkable shrink-proof, perfect-fitting hardwood flooring.

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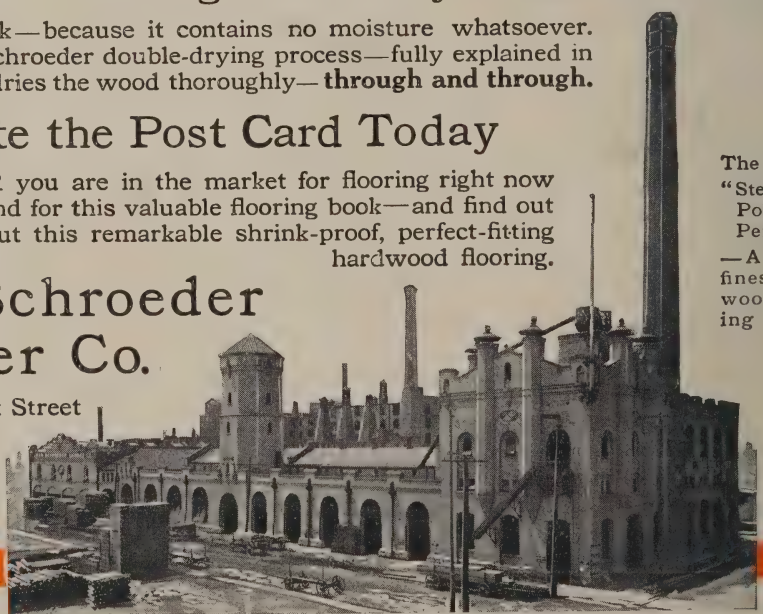

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for SEPTEMBER 1912

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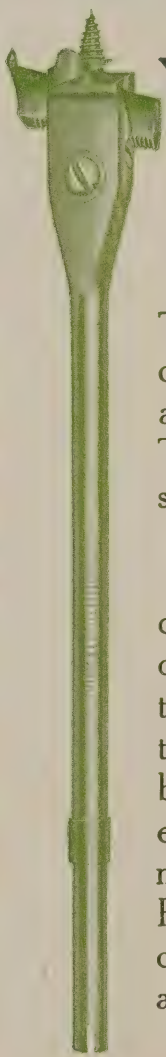
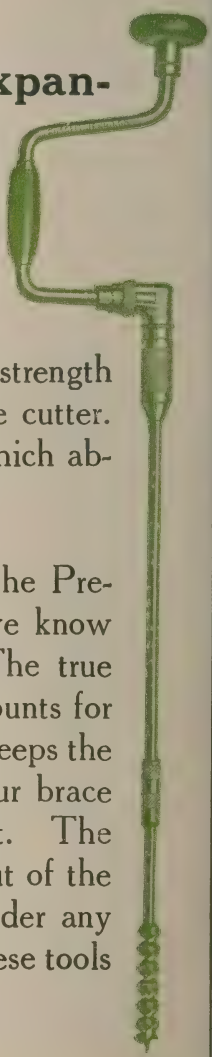


You will find **the solid head expansive bit** more reliable than any other you ever put in your brace, and this is why:



The head is one solid piece, slotted to receive the cutter. That gives you great strength and prevents chips from getting under the cutter. Then the cutter is adjusted by a worm which absolutely prevents the cutter from creeping.

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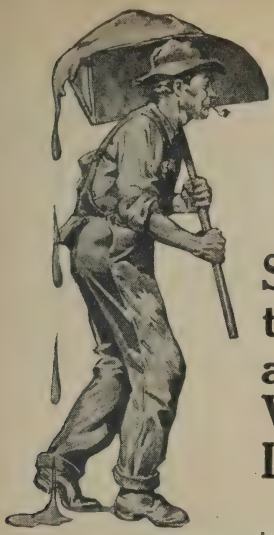

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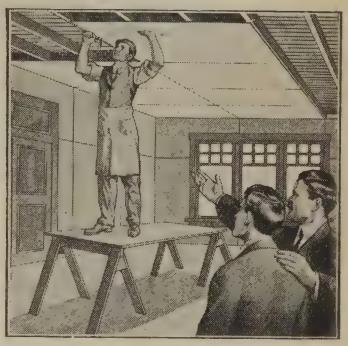

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Nail sheets to studding and **wall is ready** for paper, paint, burlap or kalsomine.

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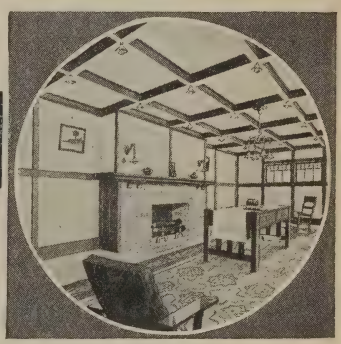

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Beaver Board is essentially a proposition for Carpenters and Builders.

CHAPTER IX

Beaver Board in Large Interiors

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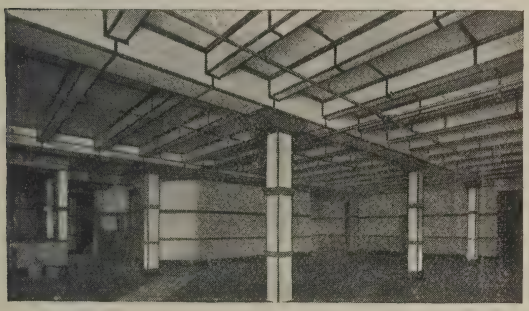
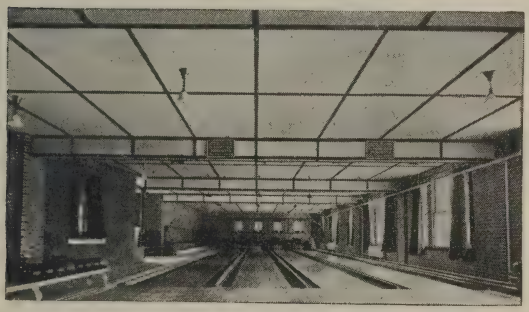
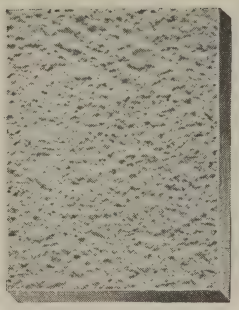
Showing the Beaver Board ceiling in the auditorium at Council Bluffs, Iowa. A difficult problem and its solution.



Showing an attractive Beaver Board job in the Stewart Speedometer Company's factory, Chicago, Ill. The carpenters have just left. Note the absence of the dirt attendant on plastering.



The bowling alley of the University Club, Buffalo, N. Y., with Beaver Board ceiling.



One of the greatest attractions of Beaver Board is its beautifully pebbled surface. The photograph reproduced above gives an idea of it, but no illustration can show the soft, rich color of that surface when painted. Beaver Board is about 3/16 of an inch thick.

BEAVER BOARD

Pure Wood-fibre Walls and Ceilings

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PURE WOOD FIBRE

TRADE MARK

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BEAVER BOARD has our registered trade-mark on the back of each panel and sample. It has also a light-cream color all the way through, that comes only by the use of sanitary, durable, **PURE WOOD FIBRE.** Insist on seeing both trade-mark and color before buying.

Wherever there is Building or Rebuilding, there is a Possible Beaver Board Job Awaiting You

Beaver Board is a carpenter's proposition. Study the accompanying illustration, study those in your previous numbers of "The National Builder." Convince yourself that others are making a good thing out of Beaver Board. Then send for "Beaver Board and Its Uses," and let us convince you that you can build up a business and a reputation as "the man who puts up Beaver Board."

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Alabastine

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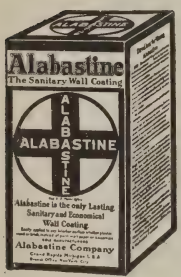

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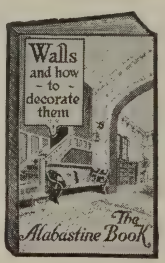

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It is easily applied, sanitary and economical.

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WALL BOARD THAT DOES NOT WARP

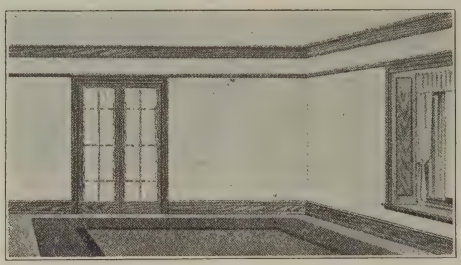
FIRE PROOF

NOT MADE OF WOOD, PULP OR PAPER

THE ONLY SATISFACTORY WALL BOARD

FOR THE ENTIRE HOUSE

Bestwall



THE MODERN WALL MATERIAL

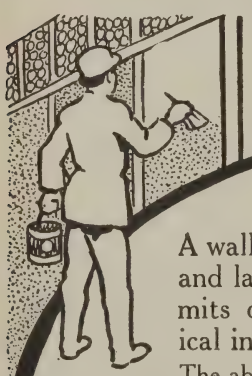
Bestwall

NO STRIPS ARE NECESSARY OVER THE JOINTS

SEND FOR SAMPLE AND DESCRIPTIVE BOOKLET

Bestwall Manufacturing Company

1247 First National Bank Building, CHICAGO



Wall Board Painted with DULLKOTE

A wall board interior, painted with Dull Kote, is sanitary, artistic and lasting, and can be washed with a sponge like tile. It permits of tasteful decorative effects, is easily applied and economical in use.

The above are only a few of the many reasons why it is the ideal wall covering for

RESIDENCES, SCHOOLS, CHURCHES, STORES, PUBLIC BUILDINGS

But be sure it's Dull Koted.

Johnston's Dull Kote Paint contains no white lead or anything injurious. It will not rub, flake or peel off, dries hard with a washable surface, free from brush marks or laps.

We will send any Architect, Carpenter or Owner our free color folder and valuable suggestions for interior decoration. Send your name in today.

The R. F. Johnston Paint Co.

Pearl & Main Sts., Cincinnati, Ohio

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Never mind what we tell you about UTILITY WALL BOARD—

We are prejudiced—

Ask us to send you a free sample so that you can see for yourself.

What it is—

Somebody may make a better wall board some day—nobody has done so yet.

UTILITY WALL BOARD

is a very tough, durable fibre-board, that takes the place of both lath and plaster. It is very easy to put on, makes no muss or dirt, doesn't have to dry and once it is on it is there to stay as long as the house lasts.

UTILITY WALL BOARD is moisture proof—is not affected by extremes of heat and cold—will not warp or crack, and may be decorated in any style desired.

BUT—let us send you the sample—

See for yourself the substantial, moisture proof construction—you'll never again want to fuss with lath and plaster.

Send your name today.

THE HEPPES COMPANY

4502 Fillmore Street **Chicago, Illinois**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

PAINE

KLIMAX

KORELOCK

"From PAINE Forest

"The TRAIL of the KORELOC
TREE TO FINISHED PRODUCT"

More than Two-Thirds of th
Reach the user through the

KLIMAX

We invite correspondence from Contracto
We respectfully remind you that the onl
promptly *is to apply for same* ***at once***

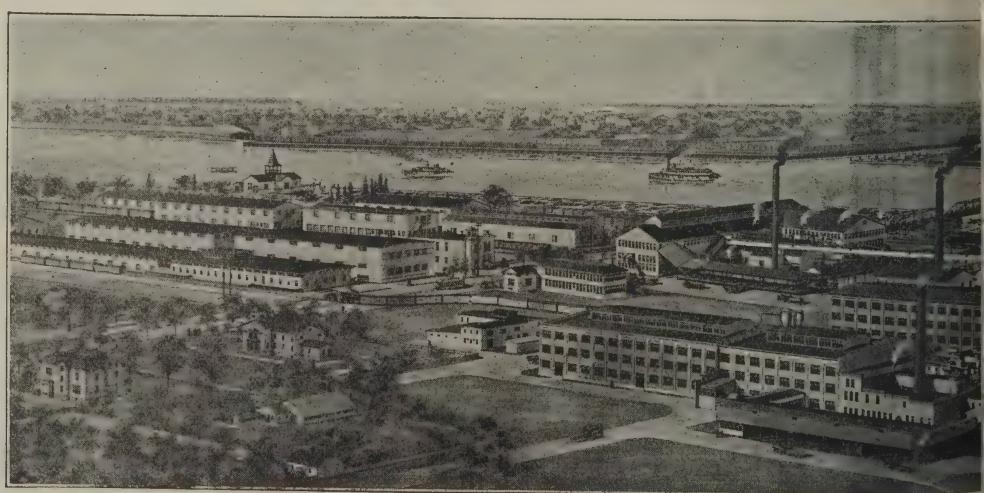
We Manufacture Everything Known

PAIN

KLIMAX

"ORIGINATORS OF THE STANDARI

OSHKOSH WI



PAINE

KORELOCK

MAY BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

KORELOCK

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to Korelock Doors"

KLIMAX

)OOR" leads straight "FROM
vithout leaving PAINE Ownership.

Vorld's Standard Veneered Doors
PAINE PLANT Shown Below.

nd Builders anywhere in the world.
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Requests met in order received).

KORELOCK

n Millwork—in Every Kind of Wood

LUMBER CO., LTD.

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ONSIN, U. S. A.

KLIMAX

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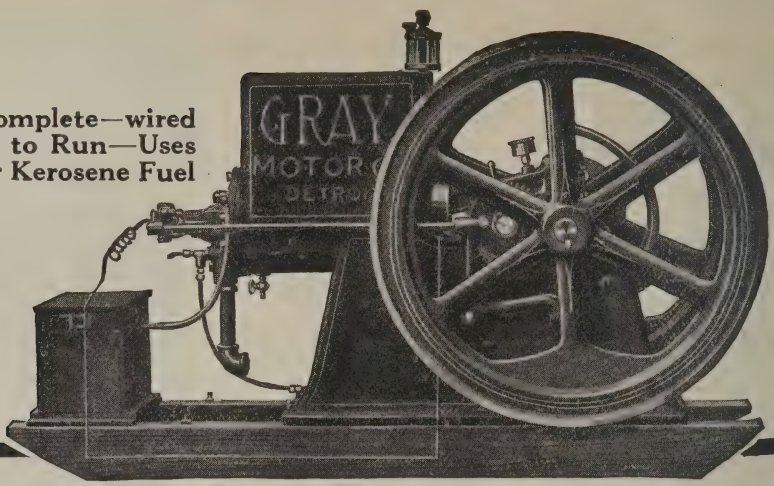
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT. BUILDER

Shipped Complete—wired up—Ready to Run—Uses Gasoline or Kerosene Fuel



RELIABLE POWER FOR THE CONTRACTOR AND BUILDER

Here's the ideal gasoline engine for the contractor and builder. It could not be better adapted to the requirements of the average man in this business if it were made especially to order for his particular needs.

Will run the band saw, emery wheel, cutoff saw, jig saw, combination wood-worker, hoisting rigs, cement mixers, etc.

Especially well adapted to running the various wood-working machines advertised in this publication.

Use it in the shop or out of doors—makes an ideal portable outfit to take around to the different jobs.

Runs in any kind of weather—requires very little attention—furnishes **big** power or little power as required, and uses fuel in proportion to the power used—the automatic governor works perfectly.

Bigger Profits on Every Job

The first cost of this high grade—guaranteed engine is only a small consideration—they make a paying investment.

The cost for fuel is very small—will run **all day** doing the work of from 2 to 4 men at a cost of from 20 to 40 cents, depending upon the work to be done and the power needed.

Hoisting Rigs

We can quote you a very attractive price on a complete 4 H. P. hoisting rig—if interested write for special information on this subject and prices.

We'll Help You Make the Right Selection

The engine shown above is a 4 H. P.—it delivers **big honest horse power too**—it's the engine that will answer the requirements of a big majority of contractors and builders.

In some cases a larger engine might be required or a smaller size might do the work you have to do.

We have other sizes to select from, 1½ H. P., 2½ H. P. (and by the way, the 2½ H. P. is another engine that we can recommend especially to carpenters and builders), 6 H. P., and 12 H. P.

If you are not sure about the exact amount of power required, get our specifications—tell us what work you want the engine to do—our service department will give you an honest recommendation of the proper power for your need.

There is no use in getting more power than you need—it's a waste of money. Then again you will be dissatisfied if you get an engine that won't do all the work you have for it to do.

Write and ask questions—get the benefit of our experience—it's to our interest to tell you and tell you **right.**

30 Days Trial

We are willing to ship you one of these engines to try out at your own work—give it hard jobs to do every day—test it out thoroughly—if it does not prove to be everything we claim for it, we take the engine back and pay the freight.

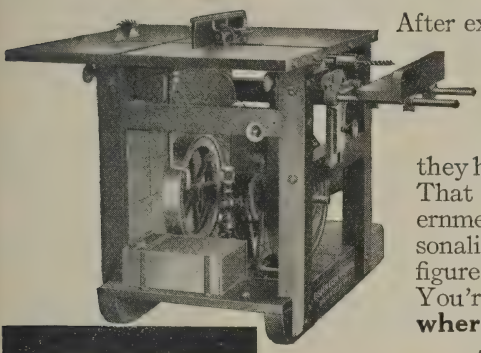
Write today for our big engine catalog and ask for information about this **special trial offer.**

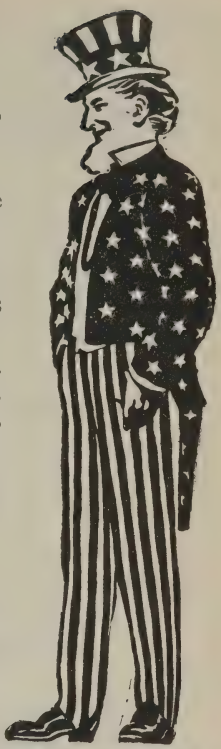
GRAY MOTOR COMPANY, 677 U. S. Motors Building. **Detroit, Mich.**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

UNCLE SAM

Is Glad He Bought Two "Evereadys"





After exhaustive search and tests, the U. S. Government saw fit, last September, to buy two "Eveready" Saw Rigs. Letter just received says they have given **good satisfaction.** That means something. Our Government buys strictly on merit. Personality of salesmen or firm cuts no figure after a machine is explained. You're always safe if you **buy where the Government buys.**

The TRADE OSHKOSH MARK *"Eveready"* **SAW RIG**

"Guaranteed for Life"

is strong as steel; yet so light two men can swing it into a rig and have it on the job in a jiffy. Simple engine. No expert needed to run it. Plain directions accompany each outfit. Fuel cost almost too small to figure in. And sawing is by no means all the "Eveready" will do. It's a whole planing mill in itself—for, besides two circle saws (cross-cut and rip) you get—

All These Attachments FREE

Jointer Head—This works on exactly the same principle as an up-to-date planer Produces a smooth, even job, with no deep cut as the material leaves the jointed head. 2-½ inches in size.

Saw Gauge and Miter Device—Saw gauge of the best gray iron, 18 inches long, adjustable to any level. Miter device adjustable to any angle, and can be used as a cross-cut gauge.

Sander—The best one yet—a great time and money saver old methods in change and economy of paper. Our methods of holding paper will not blister as do many others. 10 inches in diameter.

Jig Saw—Not a cheap one, but the best 12-inch jig we can make. All joints reinforced with steel, equipped with brass bushings. Once use it and you won't part with it.

Boring Attachment—A high-class attachment. Guaranteed absolutely accurate. Extra long boxes insure easy, long running qualities on the guides. Bits, standard size.

Dado Head—Our own special design. Does smooth, even work with or across the grain. Makes window frames, dados, etc.

Emery Wheel—A 6-inch wheel, made for grinding tools, is also furnished with this rig.

Try an "Eveready" a Week at Our Risk

Work it hard—use all the attachments. Keep track of its time and fuel and compare with the old way. Then if you will part with it, we'll gladly take it back, making no charge whatever. The risk is all ours. Write for details **now.**

OSHKOSH MFG. CO. 414 SOUTH Main Street **OSHKOSH, WIS.**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE STANDARD PORTABLE COMBINATION WOODWORKER

NINE MACHINES IN ONE EQUIPPED WITH 6 H. P. ENGINE

SEND FOR ILLUSTRATED CATALOGUE

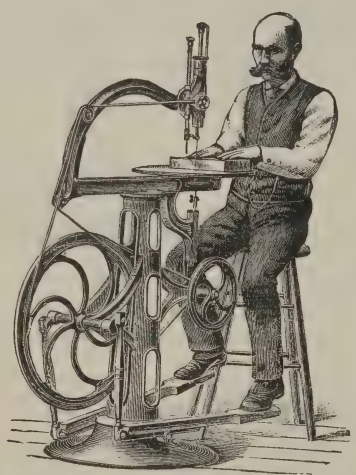
ATLANTIC ENGINE COMPANY, Inc.

MERCER STREET - - - - - MEADVILLE, PA.

CANADIAN OFFICE, BRIDGEBURG, ONT.

"Victor" Scroll Saw

For Foot and Power



Suitable for carpenters, pattern and cabinet-makers and all wood-workers requiring accurate work, also for sawing soft metals. Will cut material up to 3 inches thick, swings 24 inches, has powerful tread motion, cuts rapidly and is easy to operate. Has adjustable tension spring on upper spindle, dust blower, drill attachment, iron tilting table, etc. Will furnish tight and loose pulleys for power in place of treadles when desired.

This is acknowledged to be in all respects the most complete foot-power scroll saw made

We make a complete line of **Foot, Hand and Light Power Wood-Working Machinery,** suitable for Carpenters, Builders, Cabinet-Makers and other Wood-Workers. It will pay you to investigate their merits.

Send for Catalog A

The Seneca Falls Manufacturing Co.

629 Water Street, Seneca Falls, N. Y., U. S. A.

263

I. For Ripping.

CARPENTERS! BUILDERS!

Our new foot and hand power Circular Saw No. 4 is the strongest, most powerful and in every way the best machine of its kind. For ripping, cross-cutting, boring, grooving, dadoing, etc.

SEND FOR OUR NEW CATALOG on Foot and Hand Power Machinery, Lathes, Scroll Saws, Formers, Mortisers, Tenoners, Etc.

II. For Cross-cutting.

Solid Iron Table Planed Perfectly True—Counter-Shaft if desired

III. With Universal Mitre Gauge.

W. F. & JOHN BARNES CO., 436 Ruby Street ROCKFORD, ILLINOIS

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"A Planing-Mill on Wheels"

THE FAMOUS (No. 3) PORTABLE UNIVERSAL WOODWORKER IS A COMBINATION OF SEVERAL WOODWORKING MACHINES

Here's all the machinery you need—assembled all together—all ready for use—arranged on one base so that you can simply hitch a horse to the outfit and have it moved around from place to place as easily as a wagon.

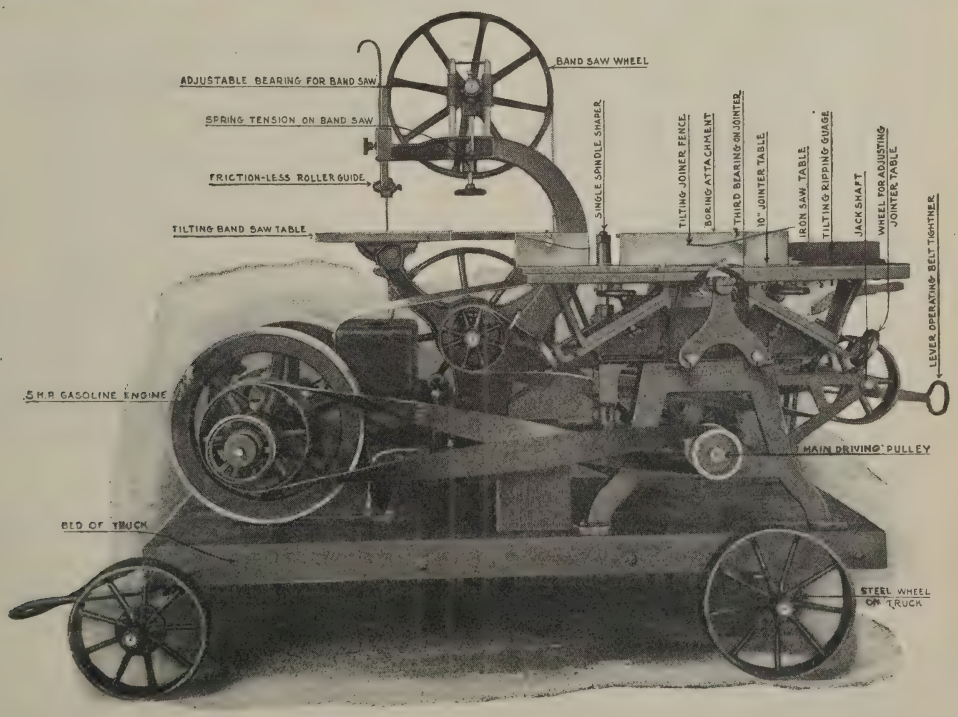
There's a 27″ Band Saw, 10″ Jointer, Upright Shaper, Boring Machine and Saw Table, connected to a 5 H. P. Gasoline Engine fitted with an endless belt. More than one machine can be used at the same time when desired.

Investigate this before you buy a flimsy "experiment." Investigate it before you buy a number of individual machines. Investigate it if you are paying out your profits to planing mills.

You raise your profits when you lower your millwork costs. You can out-distance competition, save time on the job and give greater satisfaction to your customers.

Over 1,300 Famous Universal Woodworkers are in use. The FAMOUS quality in this No. 3 Portable is absolute protection and a guarantee of satisfaction. Write at once for a complete description.

THE SIDNEY TOOL CO. - Sidney, Ohio



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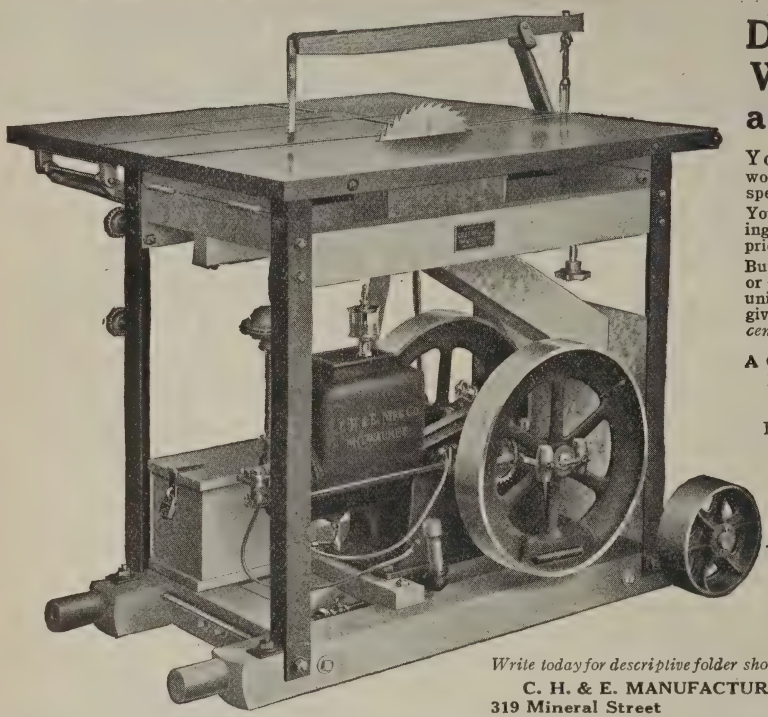


Does All Your Woodworking at 20c per day

You can buy a dozen woodworking tools and build a special shop.

You can have your woodworking done outside at current prices.

But you can't get *better* service or *more accurate* work than this unique woodworking outfit will give you — *at a cost of but 20 cents per day.*

A Complete Woodworking Plant Ready for Instant Service—Anywhere.

In a concise, corner-fitting outfit, you get saw, jointer, sander—twelve machines in all.

No delays. No idle machines. A man readily wheels this tool to the spot needed and does the work at once.

This is the original portable saw rig—embodying wide experience in the manufacture of concise, convenient and sturdy tools. Driven by self-contained gasoline engine or can be connected for belt drive.

Write today for descriptive folder showing different sizes and prices

C. H. & E. MANUFACTURING COMPANY, Inc.
319 Mineral Street **Milwaukee, Wisconsin**

One of Our Specials

27 inch Complete ⅜ Band Saw
Wright Roller Guide
Weight 800 lbs.
$55.00

32 inch Complete ⅜ Band Saw
Wright Roller Guide
Weight 1100 lbs.
$75.00

Prices F. O. B. Factory. Also a complete line of wood working machinery.
Write us about our special offers.

United Machinery Co.
88-89 Centre St. **New York, N.Y.**

MARSTON'S
Hand and Foot Power **Circular Saw**

Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

Send for Catalog

J. M. MARSTON & CO. 193 Ruggles Street BOSTON, - MASS.

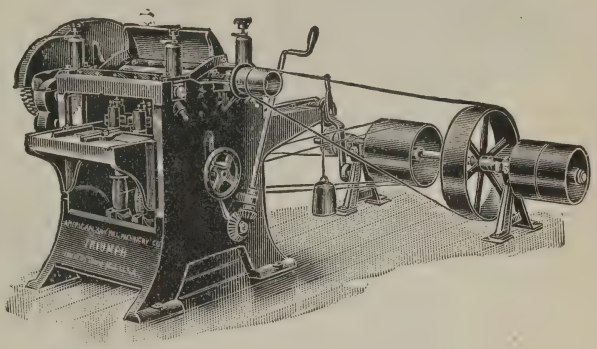
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"Triumph" Planer, Matcher and Moulder

Here is just the machine you need to make your equipment complete.

The "Triumph" is a small Planer for the small or moderate sized plant which prides itself on maintaining a high-grade output.

We can't begin to tell you here all the good points of the "Triumph". You will need the pamphlet to tell the whole story of "Triumph" superiority.



But if you want a small, moderate priced planer and moulder that will do work equal to that of the largest, most expensive machine, the "Triumph" is the one you should have. Ask for the pamphlet.

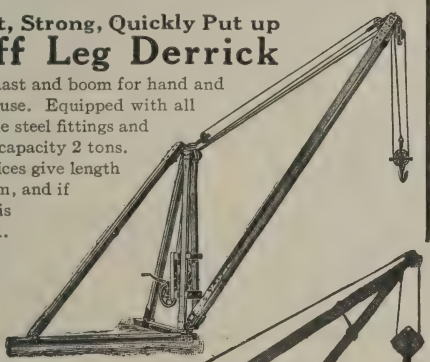
American Saw Mill Machinery Co.

80 Laight St., HACKETTSTOWN, N. J. 1650 Hudson Terminal, NEW YORK CITY

Light, Strong, Quickly Put up

Stiff Leg Derrick

split mast and boom for hand and power use. Equipped with all crucible steel fittings and gears, capacity 2 tons. For prices give length of boom, and if winch is desired.

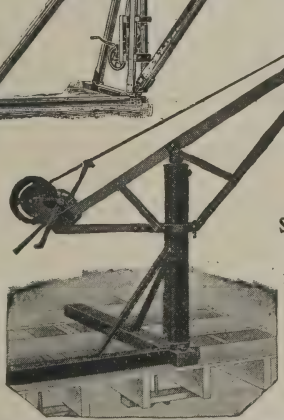


Sasgen Circle Swing Reinforced

Builders Derrick

$45.00

complete ready for use with geared winch, 150 ft. 5-16" cable, block fasteners, etc., capacity 2500 lbs.



Our Motto: Satisfaction or no Sale.

—

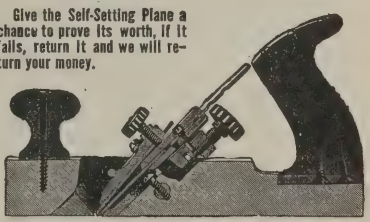
Write for Catalog "N"

SASGEN BROS. 2053-57 Racine Ave., **CHICAGO**

New York Office, 103 Park Ave.

INTRODUCTORY TRIAL OFFER

Give the Self-Setting Plane a chance to prove its worth, if it fails, return it and we will return your money.



If the SELF-SETTING PLANES are not sold in your town and you write us saying, "I saw your trial offer in N. B.", we will send you particulars, a carpenter's pencil and our $1.00 CERTIFICATE, which we will receive as $1.00 in part payment for a SELF-SETTING PLANE, as stated in our $1.00 CERTIFICATE, and if this S. S. PLANE is unsatisfactory and returned at our expense, we will send you $1.00 more than you sent us, as the $1.00 CERTIFICATE says.

As this paper guarantees we will do as our advertisment says, you know the plane must be O. K.

ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained eaty, knurly, knotty, hard or soft wood you can find, THAT IS FREE FROM SAND OR DIRT.

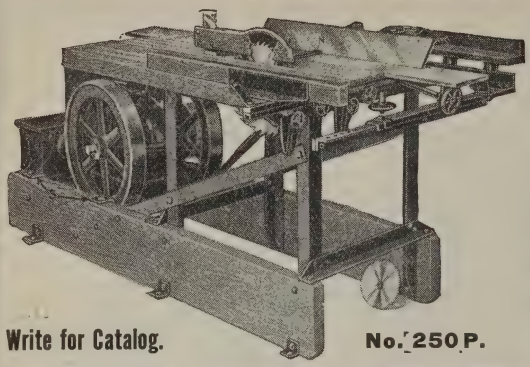
If it is not worth to YOU or YOUR MEN, TWICE ITS COST, return it at our expense, as above stated.

If you send us the addresses of ten carpenters, no matter where they live, we will send you another carpenter's pencil, hard and tough.

Carpenter's Hard, Tough Pencils, 30c per dozen, postage prepaid.

GAGE TOOL COMPANY, Vineland, N. J.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Write for Catalog. No. 250 P.

PARKS PORTABLE SINGLE AND COMBINATION
Woodworking Outfits

THIS machine combines three of the most necessary tools to have on the job, namely, Circular Rip or Cross-Cut Saw, 6" Jointer with Tilting Guide and Boring Machines. Jig Saw, Band Saw and many other valuable attachments can be added.

First, original and most practical combination of Woodworking Machinery built for the building trade, either on the job or in the shop. Largest assortment, in this line, made by any one concern in the world. Machines are made in large quantities which enables us to sell at lowest prices and to make immediate shipment Strong, substantial bases, enabling you to use any make of Engine or Motor-

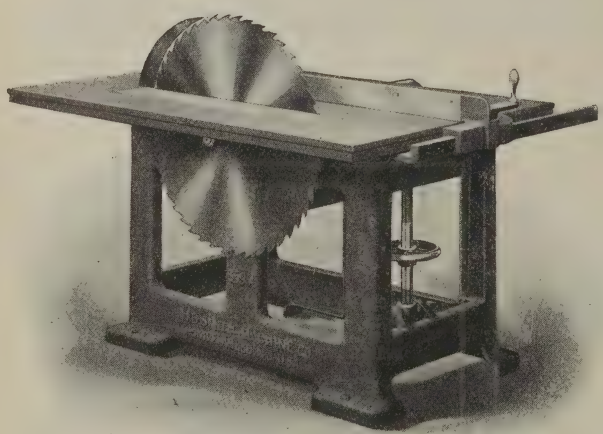
THE PARKS BALL BEARING MACHINE CO.
Knowlton and Fergus St., CINCINNATI, OHIO, U.S.A.

SMITH OF SMITHVILLE

Established 1847

Woodworking Machinery

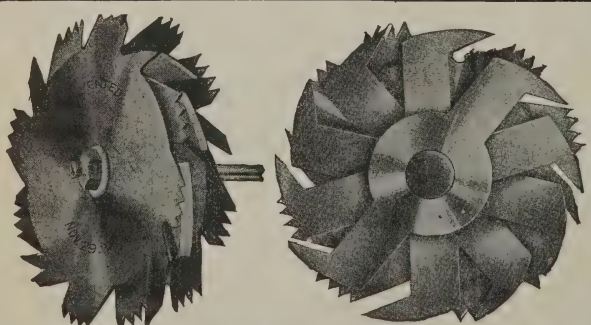
Incorporated 1878



A NEW HEAVY
Saw Bench
with
Parallel Hoist to Table

Send for Circular at once.
Address

H. B. Smith Machine Co.
SMITHVILLE, N. J.
New York Chicago Atlanta San Francisco



Showing Arrangement of Cutters

HUTHER BROS. PATENT GROOVER OR DADO HEAD
Will Save Cost in Three Days Use
Can Be Used on Any Circular Saw Mandrel

For cutting any width groove from ⅛" to 2" or over. Will cut a perfect groove, either with or across the grain, and leaves edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

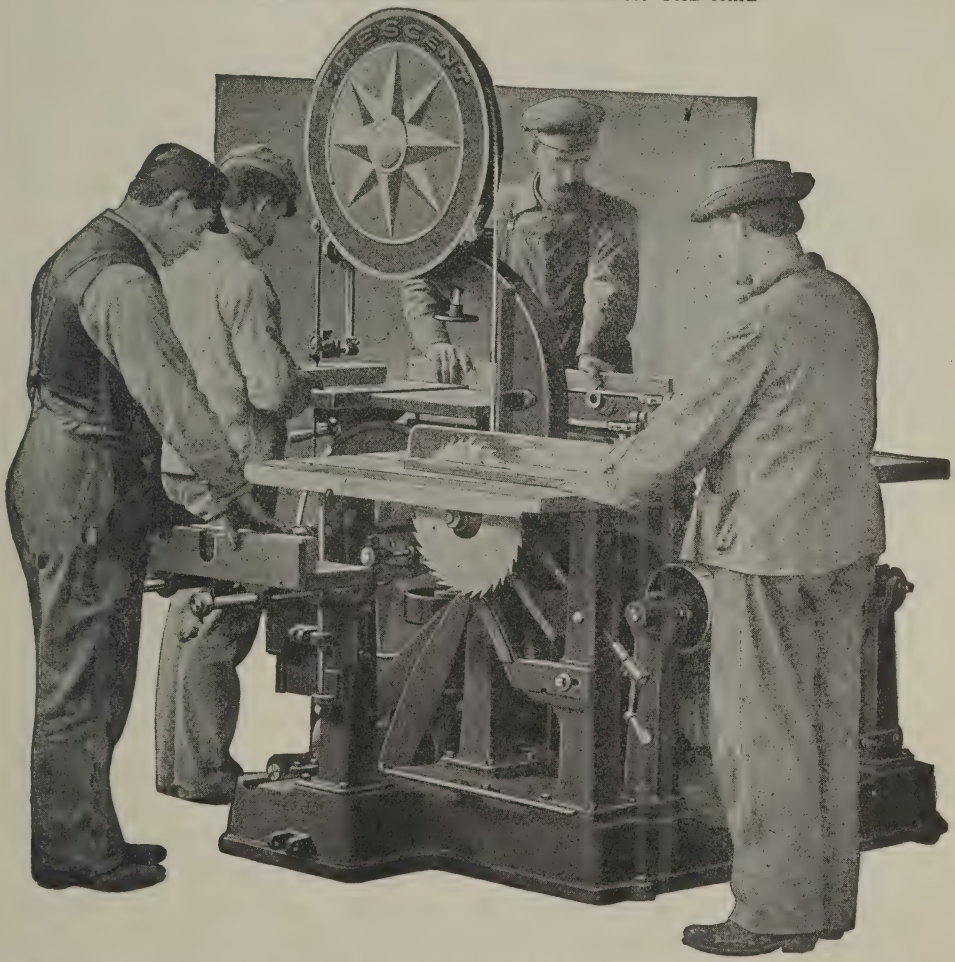
HUTHER BROS. SAW MFG. CO.
500 University Ave. Rochester, N. Y.

NAT. BUILDER
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

INCREASE THE PROFITS FROM YOUR BUILDING OPERATIONS BY TURNING OUT YOUR MILL WORK ON THE

CRESCENT UNIVERSAL WOOD WORKER

FOUR MEN CAN WORK ON THE MACHINE AT ONE TIME



THE CRESCENT UNIVERSAL WOOD WORKER

consists of band saw, saw table, jointer, reversible single spindle shaper, and borer. Various attachments can be added adapting the machine for grinding knives, doing disk grinding, mortising, tennoning, panel raising, resawing, making mouldings, rabbetting.

Send for special catalog No. 51 and find out all about this splendid machine. At the same time ask for catalog of band saws, jointers, saw tables, planers, shapers, variety wood workers, swing saws, disk grinders and borers.

THE CRESCENT MACHINE COMPANY, 10 Main Street, LEETONIA, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

ÆTNA-IZED?

WHY NOT BE ÆTNA-IZED WITH A TEN DOLLAR BILL

Ten Dollars will insure you for one year under the famous

ÆTNA TEN DOLLAR COMBINATION

In extent and variety of protection without a rival. For $10 this policy pays

$2,250.00 for death from travel or burning building accident

1,250.00 for death from ordinary accident

250.00 for death from natural causes. Paid at once upon receipt of certified copy of official certificate of death.

It also pays liberally for loss of limb or sight, and provides weekly indemnity for accidental injury that results in total or partial disability. The payments for accidental loss of life, limb or sight increase each year without additional cost, and make a possible payment of $3.250.00.

$3,250.00 Insurance for $10.00

Send in the coupon to-day

Ætna Life Insurance Co. (Drawer 1341) **Hartford, Conn.** Tear off

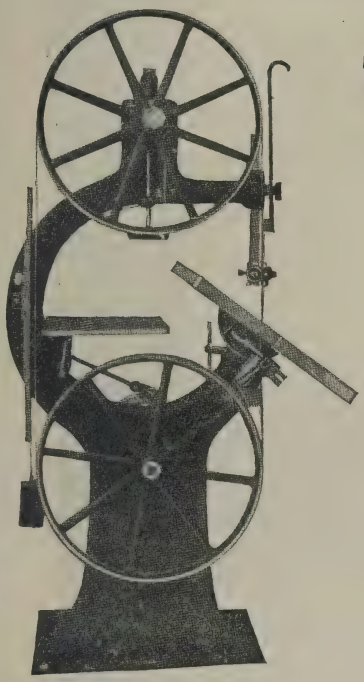
I am under 65 years of age and in good health. Tell me about ÆTNA Ten Dollar Combination. My name, business address and occupation are written below.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

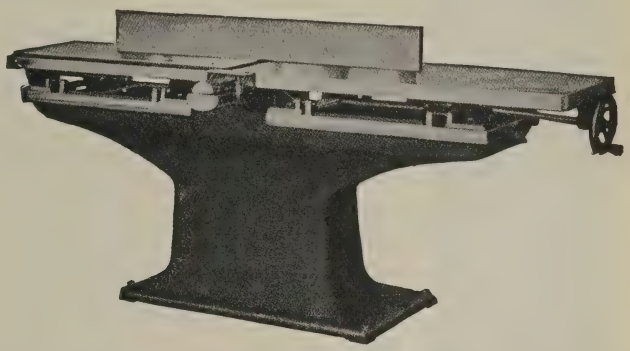
$127.00 for Both

To Contractors and Builders

Ask for Price on One if You Can't Use Both



27-Inch Chicago Band Saw



Chicago 8-Inch Jointer and Planer

Used for Planing, Jointing, Shaping, Matching, Rabbeting, Grooving, Chamfering, Beading and Making Mouldings

Send for our Free Special Catalogue today. We issue a catalogue of machines especially adapted to Contractor's and Builder's use

Use Real Machines

READ what this user writes:

July 1, 1912.

Dear Sirs:

I received my 27-inch Chicago band saw and 8-inch hand jointer together with belting and pulleys shipped by you some time ago, and have been using them ever since—almost night and day, and must say they are as good as money can buy.

Thanking you for your promptness in filling the order, I remain

Yours truly,
F. W. HAWES, Knoxville Ill.

Chicago Machinery Exchange

1213-1224 Washington Blvd. Chicago, Ill.

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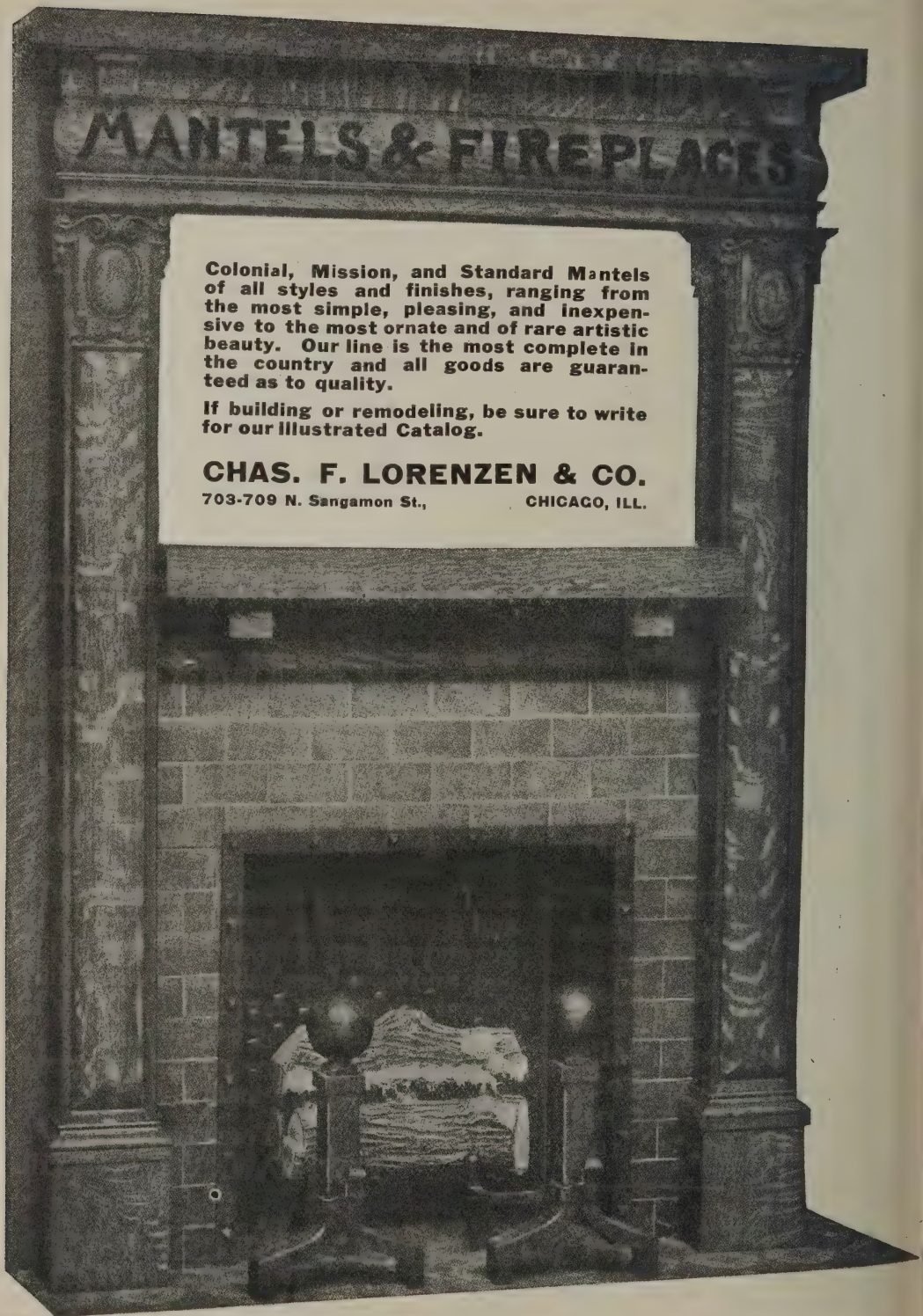
MANTELS & FIREPLACES
Colonial, Mission, and Standard Mantels of all styles and finishes, ranging from the most simple, pleasing, and inexpensive to the most ornate and of rare artistic beauty. Our line is the most complete in the country and all goods are guaranteed as to quality.
If building or remodeling, be sure to write for our illustrated Catalog.
CHAS. F. LORENZEN & CO.
703-709 N. Sangamon St., CHICAGO, ILL.

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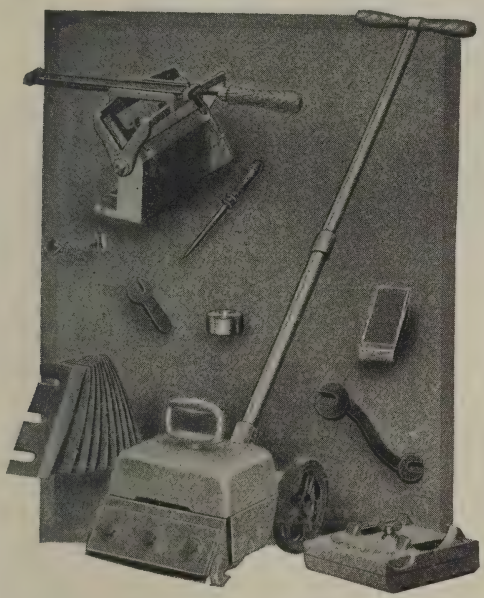
Try It Free

and thereby convince yourself just what the



Acme Floor Scraping Outfit

can do on your own work

I do not expect or want you to buy a machine that you are not thoroughly familiar with, so in order to introduce my equipment to you and to permit you to fully investigate into its merits, I make you this offer:

I will send the complete Acme Floor Scraping Outfit, as here shown, to you for a WEEK'S FREE TRIAL. I will allow you to work the machines and if after you have given them a thorough trial you find that they do not meet with your entire approval, simply send the outfit back to me and you will owe me nothing.

If this proposition sounds reasonable and you want more information, drop me a line today and I will forward booklet and full particulars by return mail.

The Acme Handy Mitre Gauge

is one of those little tools that is a great time saver. It fits in the pocket where it is always ready for immediate use. The dollar that you pay for this mitre gauge is the best investment that you ever made. If your dealer can't supply you, I can. Guaranteed absolutely accurate.

I have a circular that gives full particulars. *Write for it today.*

JOS. MIOTKE, 249 LAKE STREET MILWAUKEE, WIS.

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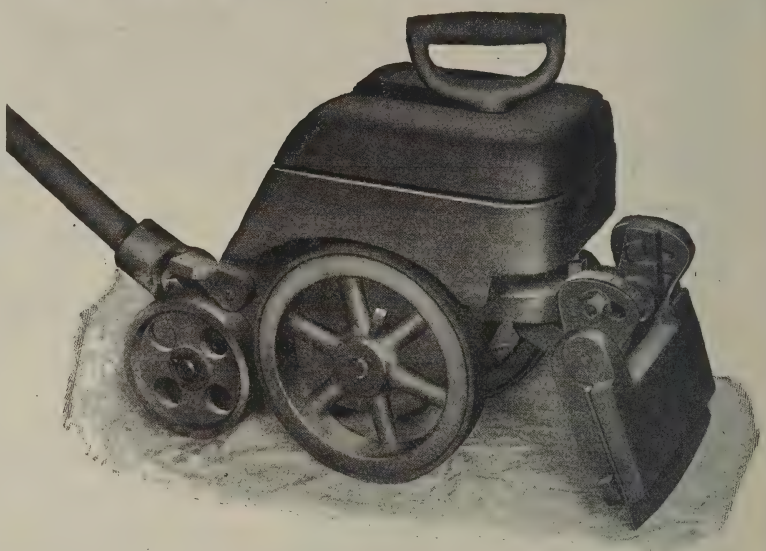
"SPRING-DRIVEN"

The
Triple "A"
SPRING DRIVEN
Floorsmoother

Is the only machine to have



¶ It costs more than other floor scrapers, **but it's a real machine.**

¶ It has a scraping capacity of 1200 square feet of floors per day.

¶ The quality of its work cannot be approached with anything else.

¶ It takes **WEIGHT, POWER** and **ADJUSTABILITY** in a floor surfacing machine to do the work right, and there's where the Triple A "Spring-Driven" shines.

¶ It has the required weight for smooth work—Power for easy running and great capacity—Adjustability for all classes and grades of work.

¶ You'll never be satisfied with your floor work until it is done with a Triple A, so why not try one on your next job?

¶ ORDER ONE. Try it on any kind of a floor—old, varnished or new. You will like it.

¶ The price of the Triple "A" Spring-Driven Floorsmoother complete, with Automatic Sandpapering Attachment, six 4¼″ x 8″ double edged scraper blades and all necessary sharpening tools, etc. (neatly packed in a special tool box), is $75.00, F.O.B. Chicago, U.S.A., or London, Canada; Payable $25.00 per month, or special discount for cash. Shipped on free trial to responsible parties. Give references with order, if not commercially rated.

TRIPLE "A" MACHINE COMPANY

24 North Clark Street **CHICAGO, U. S. A.**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

TWO KNIVES—Scrapes

Forward or Backward

Changing Off Saves Time and Strength

Pull a while, then drop rear knife and push a while—the change rests your back and increases your speed. Double knife feature also enables you to reach the center of the smallest room. Knives drop at either end and let you right into the angle of the baseboard.

The WEBER DOUBLE ACTING Floor Scraper

works perfectly at all angles on **any** flooring—maple, oak, yellow pine, fir—with or against the grain. Accurately balanced; makes a smooth "shearing" cut without a bit of side draft. But prove its worth. Try it yourself five days **free**—a couple of days on your hardest, fussiest job, bringing every feature into play. Then put it up against any other make you know of. If its work isn't the best you ever saw, return it—the trial won't cost you one cent. Take advantage of this—

Try It Five Days FREE

and decide the scraper question once for all. Send **now** for full details of this offer and our new circular just off the press, showing the Weber point by point, clearly and simply.

JOHN F. WEBER, President
WEBER MFG. CO.
661 71st Ave., MILWAUKEE, WIS.

Can't Chatter or Leave Waves in the Flooring. Scrapes Every Inch of Space.

Don't pay a big price for a floor scraper when you can get one like this for $25.00

Isn't it about time for YOU to reduce YOUR floor scraping expense?

ORDER A FOX FLOOR SCRAPER TODAY

FOX SUPPLY CO., MANU-FACTURER **Brooklyn, Wis.**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Big Profits in Concrete Specialties

Do you realize that there is a lot of money in some sand bank waiting for you to take it out? Do you know that every wagon-load of sand can be made to produce a net profit of $25? Very few people realize the large and attractive profits in the manufacture of concrete specialties. Many ambitious men are making large, attractive profits every year in this way. As an example we cite one man's experience and profits for one week.

The Work Easy—Demand Big
The manufacture of ornamental concrete articles is not difficult and can be accomplished by any ordinary careful man. Ornamental concrete moulds can be readily sold for use everywhere. They are suitable for lawns, gardens, parks, cemeteries, pergolas, and every property owner is a prospective customer for some of these articles.

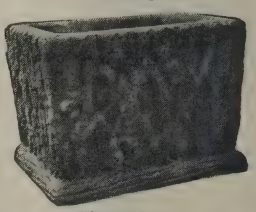
Figure the Profits for Yourself
These moulds never sell for less than $3 and generally bring $5, which is much less than the cheapest iron vase or hitching post you can buy. Concrete vases or other ornamental moulds are very beautiful, as concrete makes an ideal outdoor ornamental material.

ONE MAN'S EXPERIENCE

A single week's receipts.	
12 lawn vases, $5 each	$ 60.00
33 hitching posts, $5 each	165.00
12 flower boxes $2 each	24.00
	$249.00
Total cost of above:	
11 barrels of cement at $2	$22.00
6 yards of sand at $1	6.00
60 hours' labor at 20c	12.00
33 staples and rings for hitching posts at 10c	3.30
	$43.30

A good week's profit, $205.70.
Do you know of another line that will net you such handsome profits as the manufacture of these articles?

Hitching Post



Flower Box

The Big Northwestern Line

Everything required in the concrete industry—mixers of all sizes and description, block machines, brick machines, tools, sand screens, rock crushers, coping moulds, fence post machines. Every carpenter, builder, contractor or mason should have a copy of our catalog. You will find prices lower than any similar line of goods anywhere. Catalogs show many articles you ought to have in your business. Write and get in line for some of the good profits in this line of work.

Send for Our Beautiful Ornamental Circular—It shows everything in the ornamental line—flower boxes, flower pots, sun dials, jardinieres, lawn vases, porch column moulds, railing moulds, baluster moulds, ball moulds, chimney moulds, coping moulds, gate posts, newel post moulds, etc.

NORTHWESTERN STEEL & IRON WORKS, 1108 Spring St., Eau Claire, Wis.

Trus-Con Joist Hangers

Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.

Avoid cutting away and weakening of timbers and walls—save labor, time and money.

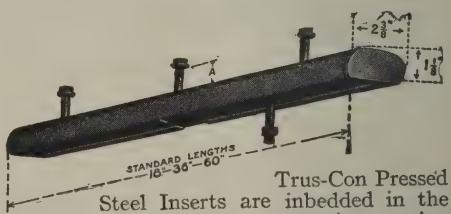
TRUS-CON JOIST HANGERS are made from open hearth steel plates, and are proven by actual test to be the strongest on the market. Note the bulb-shaped reinforcement at upper angle.

We also furnish Post Caps, Post Bases, Wall Plates and Base Plates made in rolled steel, malleable iron or cast iron.

Write for catalog and prices.

Shaft Hanger Supports for Concrete Buildings

Trus-Con Pressed Steel Inserts for Supporting Shaft Hangers in Concrete Buildings.



Trus-Con Pressed Steel Inserts are inbedded in the concrete during construction, saving expensive drilling after completion of the work. The long slots allow a wide variation in position. Special washers prevent bolts turning in the slots.

Write for details and prices.

TRUSSED CONCRETE STEEL CO.
384 Trussed Concrete Bldg. - DETROIT, MICH.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Greatest Offer Ever Made On a Cement Tile Machine

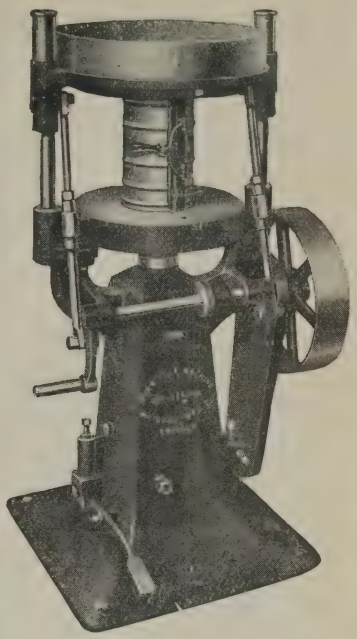
¶ For a limited time we will ship the Dunn Tile Machine on conditions that you are to

Test the Machine in Your own Plant.	AT
Test the Sale for Tile in Your Locality.	OUR
Test the Profit in the business.	RISK

¶ We have lots of confidence in our machine and the business or we wouldn't dare ship machines this way Put one of these machines in your plant at our risk. Make up several thousand sample tile and show them to the farmers. They will not hesitate in buying them. Figure the cost of making a thousand tile and see for yourself the big profit there is in this business.

¶ Get Started Now. The farmers will need lots of tile this Fall, so don't delay. You may as well have the profits on the tile used in your vicinity as the clay man.

¶ Write for catalog and limited time proposition.



Dunn Tile Machine

Makes all sizes of tile from 3 to 12 inches and makes them perfect. Capacity, 1,800 tile per day. ¶ Send for a catalog.

Price $40

Combination Block Machines

¶ You won't find a simpler, better block machine anywhere. It makes blocks from a wet mixture, thus making a denser and more waterproof block than with the usual semi-dry mixture.

¶ It makes blocks in widths of 8, 10 and 12 inches, all on the one size wood pallet. It makes veneer and two-piece wall blocks in widths of 2, 3 and 4 inches in different designs. It is a simple, practical machine that will make all blocks used in ordinary building construction.

¶ Send for a catalogue.

Ornamental Porch Molds

¶ A Sure Money Maker. We make a full line of ornamental molds for making concrete porches, piers, chimneys, etc. The molds are sold separately or in outfits for making complete porches at prices that will astonish you.

¶ Send for a catalogue. It shows the different molds and the many products they will make.

W. E. Dunn Mfg. Co.

4135 Fillmore Street, Chicago, Ill.

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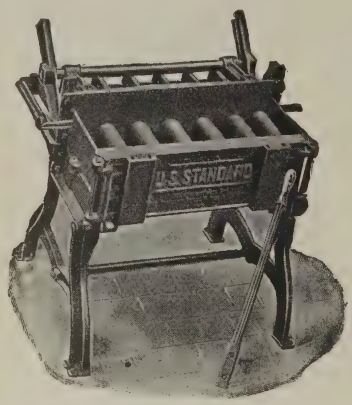
PROFITS

In block making are dependent on the simplicity of the block machine to operate quickly and with a sureness of turning out each block perfect.



Three reasons why the **U. S. Standard Block Machines** make money for contractors and builders:

Simplicity

With its sturdy and simple construction any amateur can operate it with a few hints on the essential points. No clamps, chains, cogs, wheels or springs to get out of order.

Speed

Its simplicity gives greater speed than more complicated machines. We challenge competition.

Strength of Block

The greater number of small cores instead of two large ones give as much air space and more strength. This is why U. S. Standard made blocks are the nearest to perfection.

Send for detailed information on cost of machine and block making.

The Ashland Steel Range & Mfg. Co.
Ashland, Ohio

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Knocked Down, Ready To Erect

Self Retaining Machine. Hardwood Car. Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one.

Send for Descriptive Pamphlet

R. M. RODGERS & CO.
74 Emerson Place, Brooklyn, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

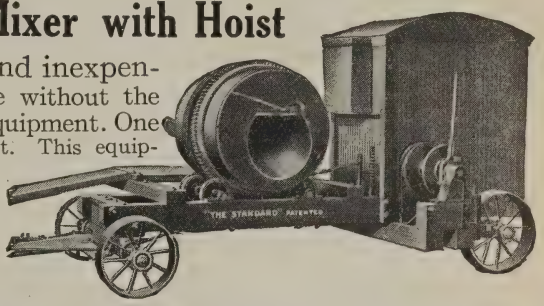
"The Standard" Low Charging Concrete Mixer is built to meet every contractor's wants

Why is it every contractor says "The Standard" is the best on the market?

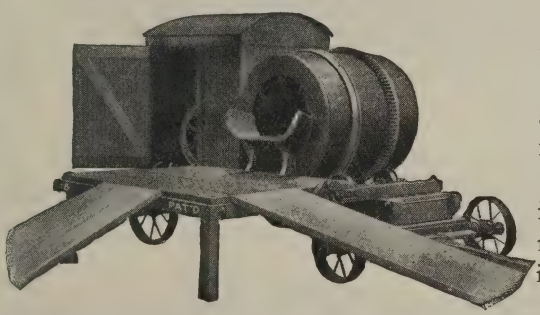
Because "The Standard" cuts down expense in many ways, such as: Does not get out of order, costs less to operate, easy running, no high charging platforms to build and does not cost as much in the first place.

"The Standard" Mixer with Hoist

is made for the easy, quick and inexpensive handling of the mixed concrete without the necessity of having separate hoisting equipment. One engine drives both the Mixer and the Hoist. This equipment is especially adapted for general building work, silos, towers, tanks, etc., etc. We can furnish you with this equipment in various sizes and capacities, and with or without reversing hoist for operating two cage elevator.



"The Standard" Mixer with Folding Platform



Has many advantages especially where the mixer is moved frequently as the work progresses or from one job to another. This platform can always be folded in front of the drum for moving, and as soon as it arrives on the job it is dropped down in mixing position, making a wide platform ready for immediate use.

Ask for our catalog No. 32—also our catalogs on wheelbarrows, hoists, gas and steam engines, pumps, trucks, etc.

The Standard Scale & Supply Co.

CHICAGO
1345-1347 Wabash Ave.

NEW YORK
136 W. Broadway

PITTSBURGH
243-245 Water St.

PHILADELPHIA
35 So. 4th St.

The Standard Scale and Supply Co.

Please send me Mixer Catalogue No.32

Name.....

.....

Street.....

Town.....

State.....

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NOTE—Wise, up-to-date **Contractors** and **Builders make a hit** with their best customers by **Recommending Cypress, "The Wood Eternal." Do you?**

CAN YOU THINK OF ANY HARDER TEST FOR WOOD THAN GREENHOUSE USE?

You know ordinary wood in greenhouses lasts *not over 4 years.*

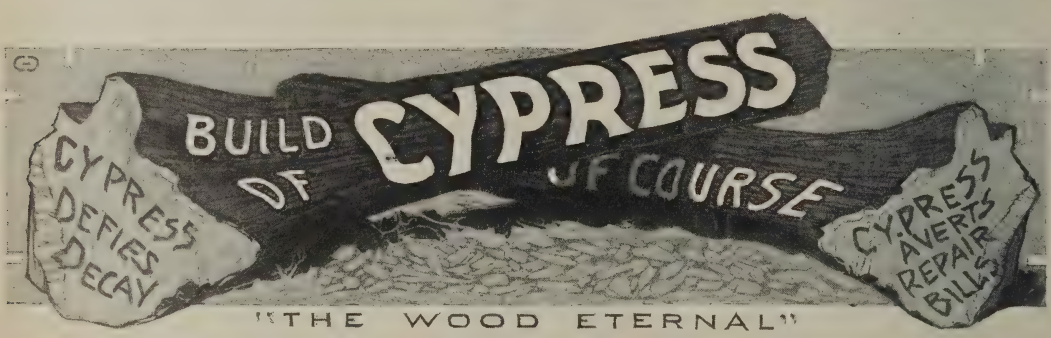
Zero on one side, hot humidity on the other, constant contact with wet rich earth and compost, constant sprinkling and sweating, all combine in *an invitation to hurry up and rot.*

NEXT TO THE GROWTH OF THE PLANTS THEMSELVES

THE BUSIEST THING IN A GREENHOUSE

is the decay-tendency of the wood it is mostly made of.

THOSE WHO MAKE GREENHOUSES A BUSINESS



One of the largest greenhouse manufacturers, J. C. Moninger Co., Chicago, says:

"We first began using Cypress *exclusively* for greenhouse construction in 1885, using it previously in conjunction with pine. The greenhouses then built with Cypress *are being used today* by their owners and the *wood* is found *perfectly preserved and free of any decay or rot.*" *Figure it out yourself.*

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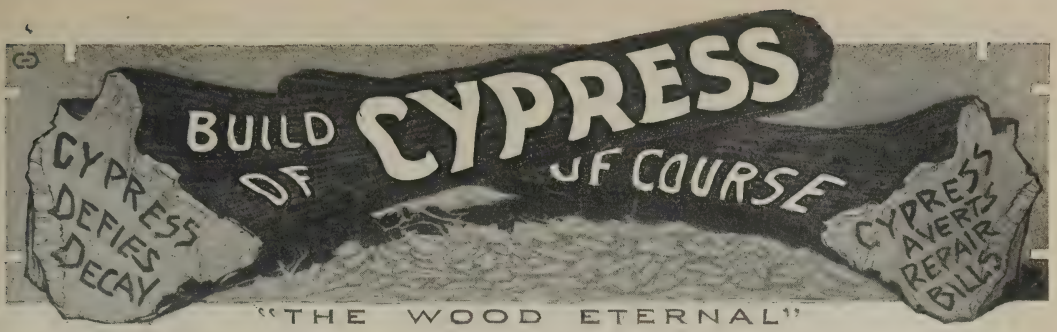

WRITE TODAY for VOLUME 3 of the CYPRESS POCKET LIBRARY, with 20 PAGES of Valuable Guidance for Greenhouse Contractors. (SENT PROMPTLY and no charge.)

"WOOD THAT WILL STAND THE GREENHOUSE TEST WILL STAND ANYTHING," SO INSIST ON CYPRESS "& NO SUBSTITUTES."

When planning new improvements or repairs to old ones, just remember—*"With CYPRESS you BUILD but ONCE."*

Let our "ALL-ROUND HELPS DEPARTMENT" help YOU. Our entire resources are at your service with Reliable Counsel

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION
1212 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

INSIST ON CYPRESS AT YOUR LOCAL DEALER'S. IF HE HASN'T IT, *LET US KNOW IMMEDIATELY.*

"The better a builder builds his buildings—or even alterations—the he builds his own reputation." The better builders all over the country are glad when their customers insist on **Cypress, "The Wood Eternal,"** or permit them to use it. Cypress is best for the owner because it lasts practically forever **without decay.** (And Cypress is easy to work—**Good for Your Tools.**)

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"Hey You! Don't You Know Any Better Than That?"

OF course, he doesn't or he wouldn't be where he is—he wouldn't be doing manual labor at small pay and stand for being bullied around by the boss. Men who do stand for this sort of thing neglected their opportunities—they didn't realize that they needed something beside brawn to get ahead in the world. ***Brains*** count for more than brawn, and ***training*** plus ***brains*** will place you in a position where ***you*** will be boss instead of bossed, where ***you*** can do the ordering and the other man the work, where ***you*** will ***get the money*** for what you know, not for what you do.

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The ***American School of Correspondence*** was established fifteen years ago for the benefit of ambitious men everywhere. The ***American School*** makes it possible to obtain an education without leaving home or giving up work. The ***American School*** brings a college course and special training to you right in your own home, no matter where you live. It will train you in any branch of Engineering, Business and Law or prepare you for entrance into any resident college.

Are you satisfied with your present job and salary? If not, why don't you get the training you need to hold a better job? The training you receive from the ***American School of Correspondence*** will not only help you to earn more money, but will start you on the road to success and enable you to enjoy the good things of life. Just try it a year—pay as you go—all we ask is that one hour a day be spent in faithful and conscientious study.

Write us now, while the subject of self-betterment is uppermost in your mind. Tell us how far you went in the public schools, what you are doing now and what you would like to be. We'll give your case special attention—help you decide on the best course. Check the coupon and mail it now, before you forget it.

This is your Opportunity

Check the course you want and mail the coupon now

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Please send me your Bulletin and advise me how I can qualify for the position marked "X." **N. B. 9-12.**

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....Draftsman	....Fire Ins. Engineer
....Architect	....Telephone Expert
... Building Contractor	....Moving Picture Op'r
....Structural Engineer	....Bookkeeper
....Civil Engineer	....Stenographer
....Electrical Engineer	....Accountant
....Elec. Light & Power Supt.	....Cost Accountant
.... Master Mechanic	....Cert'f'd Public Acc'nt
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....Steam Engineer	....Business Manager
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American School of Correspondence
CHICAGO, U. S. A.

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The NATIONAL BUILDER

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Fred. A. Hodgson, President. Fred. D. Porter, Secretary and Treasurer.
Geo. A. Fargher, V. Pres. and Adv. Mgr.

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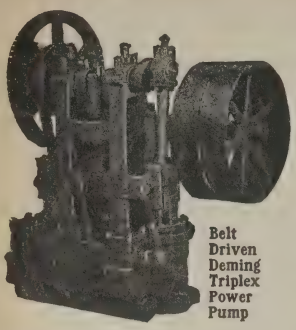

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DEMING PUMPS

May be belt driven or direct connected to electric motor, gas or gasoline engine. Made in all sizes for any service.

Ask for our Power Pump Catalog

THE DEMING COMPANY

SALEM, OHIO

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DEPARTMENT 2-F

Ford Auger Bit Co.

Holyoke, Mass.

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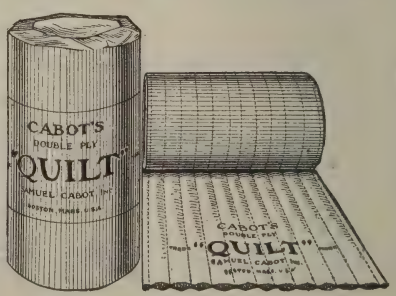

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THE NATIONAL BUILDER

Vol. 54 (48th Year) CHICAGO, SEPTEMBER, 1912 No. 5

A House at Collingwood, Ont.

JOHN WILSON, Architect.

STYLES in buildings change year by year and tastes vary with the individual, the architect, the locality and the climate. The intrinsic value of materials is often subordinate to these changes and conditions. For this reason, we see various materials used as the principal construction of a building. Where timber is plenty the greater number of buildings are frame construction. In other localities, the preference is for local stone, as it is sometimes possible to gather enough from the site to practically erect a building. In other places, concrete and stucco have distinct advantages. Over all of these, however, brick has the advantage of being available in almost every locality, the various qualities being as a rule obtainable with slight difficulty. In the present case, the residence of Dr. Irwin at Collingwood, Ont., was built of brick as it was desired to erect a house substantial, imposing and suitable to one of his professional and social standing.

In preparing the estimate for this house we have been guided by typical conditions, which would ordinarily be encountered throughout the United States and Canada. No unusual construction was contemplated or considered other than that necessary to withstand the cold winds and snow generally met with in the northern part of the United States, and local conditions, such as frequently influence prices of materials have been disregarded in order that we might arrive at a price which would neither be too low for the localities where building materials and labor are expensive, nor too high where conditions were more favorable for economical construction.

The house in question, which is shown in perspective on the front cover and in detail on our supplement sheet, was designed by Mr. John Wilson, architect. The plan shows a layout providing the necessary rooms in good proportion and arrangement with very little space wasted in halls, corridors and useless angles. The exterior presents an imposing appearance, the ashlar facing on the first story in the front adding a touch of dignity to the building while the brick walls are of a more formal character.

Our estimator places the cost of this building exclusive of architect's fees, etc., at $9,671.64, which makes the cubic foot cost about fourteen and one-half cents. In many locations this would be considered an extremely low figure, as it is only slightly above that of frame construction, while the advantages in appearance, permanence and comfort more than repay the additional outlay.

Estimate of Collingwood House*

By I. P. HICKS.

EXCAVATING AND MASONRY.

340 yds. excavating, 35c.....	$ 129.00
162 yds. cement floor, 60c.....	97.20
1,820 cu. ft. concrete wall, 25c....	455.00
21 lineal ft. chimney breast, $2.50.	53.50
25 ft. above breast, $2.....	50.00
46 lineal ft. double flue chimney, $2	93.00
1,000 sq. ft. stone facing, 18c.....	1,800.00
16,000 face brick laid in wall $24.	384.00
65,000 common brick laid in walls, $12	780.00
132 lineal ft. stone base, 40c.....	52.80
75 ft. lineal stone, lintel, 40c.....	30.00
75 lineal ft. stone sills, 30c.....	22.50

*Materials are figured at Omaha prices. Carpenter labor figured at 40 cents an hour.

20 lineal ft. stone coping, 35c	7.00
2 chimney caps	5.00
Porch trimmings	6.00
Total excavating and masonry	$3,965.00

LUMBER BILL.

	Feet
18 2x12x22 ft. first floor joists	792
16 2x12x12 ft. first floor joists	384
10 2x12x16 ft. first floor joists	320
26 2x12x14 ft. first floor joists	728
10 2x12x16 ft. first floor joists	320
15 2x12x20 ft. second floor joists	600
18 2x12x16 ft. second floor joists	576
24 2x12x18 ft. second floor joists	864
6 2x12x14 ft. second floor joists	168
6 2x12x16 ft. second floor joists	192
15 2x10x20 ft. ceiling joists	495
24 2x10x16 ft. ceiling joists	648
24 2x10x18 ft. ceiling joists	720
6 2x10x14 ft. ceiling joists	138
80 2x4x12 ft. attic ceiling	640
18 2x10x10 ft. porch joists	297
6 2x10x16 ft. porch joists	162
16 2x6x10 ft. porch ceiling	96
6 2x8x16 ft. porch ceiling	126
18 2x4x10 ft. porch rafters	117
6 2x4x16 ft. porch rafters	60
40 2x4x16 ft. dormers	440
18 2x6x24 ft. rafters	432
3 2x6x30 ft. hip rafters	90
42 2x6x20 ft. rafters	840
40 2x6x16 ft. rafters	640
60 2x4x16 ft. plates	660
80 2x4x12 ft. plates	640
20 2x10x16 ft. wall plates	130
220 2x4x10 ft. partitions	1,430
100 2x4x18 ft. partitons	1,200
112 2x4x16 ft. partitions	1,232
40 1x6x12 ft. No. 1 com. braces	240
20 1x4x12 ft. No. 1 com. bridging	60
360 1x2x10 ft. No. 1 com. furring	600
Total ft. framing lumber	17,053

17,053 ft. framing lumber at $26	$443.38
4,200 ft. 8 in. No. 2 Y. P. lap rough floors, $26	109.20
4,800 ft. 2¼ face oak flg., first and second floors, $80	384.00
1,400 ft. star Y. P. flg., attic, $30	42.00
850 ft. ⅝x4 in. cypress ceiling cornice, $31	26.35
300 ft. ⅝x4x12 ft. cypress ceiling porch, $31	9.30
140 ft. ⅝x4x10 ft. cypress porch, 31	4.34
320 ft. 1x4x12 ft. cypress flg. porch, $45	14.40
160 ft. 1x4x10 ft. cypress flg. porch	7.20
400 ft. 1x12x12 to 16 ft. cypress finish, $45	18.00
150 lineal ft. 1x8 cypress finish, $45	4.50
250 lineal ft. 1x6 cypress finish, $45	5.63
150 lineal ft. 1x4 cypress finish, $45	2.25
5 1⅛x12x14 ft. cypress finish, $50	4.50
60 lineal ft. 1x6 N. P. com	1.50
3,400 ft. 1x6 No. 2 sheathing, $26	88.40
34 M. red cedar shingles, $4	136.00
Total lumber bill	$1,300.95

MILL WORK.

5 cellar window frames, 12x10, 4 lt, $2	$ 10.00
3 cellar window frames, 16x10, 1 lt, $1.50	4.50
5 cellar windows, 12x10, 4 lt, $1.50	7.50
3 cellar sash 16x10, 1 lt	2.25
4 cellar door frames, 2 ft. 6 in. by 6 ft. 6 in., $2.25	9.00
4 cellar door frames, 2 ft. 6 in. by 6 ft. 6 in., $2.25	9.00
1 front door frame 3 ft. 4 in. by 7 ft. 0 in.	3.50
1 door frame 2 ft. 8 in. by 7 ft. 0 in.	2.75
1 door frame 2 ft. 8 in. by 6 ft. 8 in.	2.50
12 window frames 24x36x22, 2 lt., $2.25	27.00
1 twin sash frame 20x22	4.00
2 sash frames 20x28	3.75
1 twin frame 24x36x24, 2 lt	4.50
7 window frames 24x36x24, 2 lt., $2.25	15.75
1 window frame 36x36x24, 2 lt	2.25
4 window frames 18x36x24, $2.25	9.00
1 twin sash frame 18x38	4.00
1 sash frame 20x30	2.00
1 sash frame 42x30	2.00
3 triple dormer sash frames 22x22	18.00
1 twin dormer sash frame 22x22	4.00
12 windows 24x36x22, 2 lt., $2.25	27.00
2 sash 20x22	3.00
2 sash 20x28	3.50
9 windows 24x36x24, 2 lt	22.50
1 window 36x36x24, 2 lt	3.00
4 windows 18x36x24, 2 lt	8.00
2 sash 18x38	4.00
1 sash 20x30	2.00
1 sash 42x30	2.75

11 sash 22x22	22.00
1 transom 3 ft. 4 in. by 1 ft. 2 in. over all	2.00
2 set sliding door jambs 5 ft. 0 in. by 7 ft. 0 in.	4.00
1 set sliding door jambs 5 ft. 8 in. by 7 ft. 0 in.	4.25
3 set door jambs 2 ft. 6 in. by 6 ft. 8 in., 80c	2.40
1 set door jambs 2 ft. 4 in. by 6 ft. 8 in.	.80
4 set door jambs 2 ft. 0 in. by 6 ft. 8 in.	3.20
4 set door jambs 2 ft. 6 in. by 6 ft. 6 in.	3.20
1 set door jambs 2 ft. 4 in. by 6 ft. 6 in.	.70
11 set door jambs 2 ft. 0 in. by 6 ft. 6 in.	6.60
3 set jambs 2 ft. 6 in. by 6 ft. 6 in., attic	.90
3 set jambs 2 ft. 0 in. by 6 ft. 6 in., attic	.90
1 front door 3 ft. 4 in. by 7 ft. 0 in. by 1¾ in.	18.00
1 vestibule door 3 ft. 4 in. by 7 ft. 0 in. by 1¾ in.	17.00
1 door 2 ft. 8 in. by 7 ft. 0 in. by 1¾ in.	4.50
1 door 2 ft. 8 in. by 6 ft. 8 in. by 1¾ in.	4.25
2 sliding doors 5 ft. 0 in. by 7 ft. 0 in. by 1¾ in.	20.00
1 sliding door 5 ft. 8 in. by 7 ft. 0 in. by 1¾ in.	12.00
3 doors 2 ft. 6 in. by 6 ft. 8 in. by 1⅜ in., $2.80	8.40
1 door 2 ft. 4 in. by 6 ft. 8 in. by 1⅜ in.	2.80
4 doors 2 ft. 0 in. by 6 ft. 8 in., $2.70	10.80
4 doors 2 ft. 6 in. by 6 ft. 6 in., 2.80	11.20
1 door 2 ft. 4 in. by 6 ft. 6 in.	2.70
14 doors 2 ft. 0 in. by 6 ft. 6 in., $2.50	35.00
3 doors 2 ft. 6 in. by 6 ft. 6 in., $2.50	7.50
104 plinth blocks, 8c	8.32
900 ft. casing, 12 ft. length, 3c	27.00
390 ft. head casing, 3c	11.70
390 ft. cap mold, 2c	7.80
390 ft. fillet, ½c	1.95
160 ft. window stool, 2c	3.20
160 ft. apron, 2c	3.20
486 ft. door stop 14 ft. length, 1c	4.86
560 ft. window stop ½c	2.80
976 ft. base, 4c	**39.04**
976 ft. floor mold, 1c	9.76
306 ft. base attic, 3c	9.18
306 ft. floor mold, ½c	1.53
4 thresholds, 15c	.60
160 ft. beam ceiling, 20c	32.00
650 ft. picture mold, 1½c	9.75
Front stairs	60.00
Back stairs	35.00
Rear stairs	20.00
Attic stairs	15.00
Book case	15.00
China closet	15.00
Sideboard	40.00
Cupboard	18.00
Linen closet	12.00
Medicine cabinet	6.00
Total mill work	$836.79

CARPENTER LABOR.

17,053 ft. framing lumber, at $10	$170.53
4,200 ft. sheathing rough floors, $10	42.00
4,800 ft. 2¼ face flg., $20	96.00
Smoothing floors	60.00
1,400 ft. 3¼ face flg., $15	21.00
440 ft. porch floor, $15	7.26
400 ft. porch ceiling, $15	6.00
3,400 ft. roof sheathing, $10	34.00
34 M. shingle, $2	68.00
200 lineal ft. main cornice, 15c	30.00
100 lineal ft. dormer cornice, 12c	12.00
100 lineal ft. porch cornice, 18c	18.00
Porch steps, etc.	12.00
Cellar stairs	15.00
Work in basement	12.00
Setting frames	18.00
Finishing, 45 per cent cost of mill work	376.56
Total carpenter labor	$998.35

RECAPITULATION.

Excavating and masonry	$3,965.00
Lumber bill	1,300.95
Mill work	836.79
Carpenter labor	998.35
Nails and hardware	85.00
Tin work	55.00
Plastering, 1,800 yards, 27c	480.00
Plumbing	425.00
Electric wiring	75.00
Painting	315.00
Heating (hot water)	675.00
Incidentals, 5 per cent	460.55
Total estimate	$9,671.64

EDITORIAL

"Still they come." We refer to congratulations sent us by readers who seem pleased because of the change made in the "make-up" of THE NATIONAL BUILDER.

* * *

It is an acknowledged fact that breadth of view, depth of character, the ability to foresee results, and to initiate action, and to persevere along that line of action, go to make up all the most valuable traits of a cultivated workman.

* * *

Shortly after the opening of the first Brooklyn suspension bridge, the writer walked across it accompanied by an eight-year-old niece. It was a warm, pleasant day —Sunday, I think—when suddenly the little girl cried out in a voice of terror: "Oh, Uncle, the bridge is falling!" Sure enough, there was a slight tremor felt on the roadway and on the huge cables; the disturbance did not last a full second, but many persons noticed it, most of whom thought it was due to some local impact or sudden jolt of heavy vehicle. The girl said at the time she distinctly saw the top of the bridge towers move as though they were going to fall. She may have noticed a slight movement, but I think her imagining the top of the tower moving was due to the fact that I had only a few minutes previous shown her the spot where a number of people had been killed by being crowded over the parapets of the walls because of a panic having been caused on the New York end of the bridge by a silly incident, the day the structure was formally opened.

* * *

Whether the little girl saw the towers move or not is not a matter of much consequence at this date, but it was well known by many scientific men and others in New York City that there was a slight shock of an earthquake occurred at the very moment my niece uttered the cry that the "bridge is falling!" We refer to this incident as above because of it establishing the fact that the great city of New York is not immune from earthquake disturbances, and that any day—or worse, still—any night—may bring with it a shock sufficiently violent to bring down level with the earth many, if not all, of the cloud-touching structures that now grace the streets of the city, with all the possible destruction of life and property imaginable. That such a calamity may never happen is devoutly desired, but mere man has no right to put his trust in chance when hundreds and hundreds of lives make up the forfeit, particularly where there is no real necessity for taking the chance, other than that of the loss or gain of dollars more or less. Lord Bacon is accused of saying that "Wise men build houses and fools live in them." Had he lived in the present day and taken an evening stroll on Broadway, in lower New York, or in the heart of Chicago, he probably would have said, "Men careless of the lives of their kind build towering office structures and reckless business men occupy them." This seems to us all wrong and in a great measure unnecessary, and leads us to ask, "Why, beyond dollars and cents, are these tall buildings per-

mitted to be erected?" This question is gradually forcing itself to the front and must be answered before a great while.

* * *

"No pent-up Utica contracts our powers.
The whole boundless continent is ours."

This is a country of almost boundless dimensions, and why we should build up into the clouds with all the dangers and disadvantages such a system produces, is a puzzle to most thinking minds. It is un-American and out of harmony with our national ideals. Length and breadth, suit our instincts and conform to our sense of proportion and fitness of things, to a much greater extent than height. Why, then, should we make such endeavors to out-Babel the ancient and foolish "Babelers," whose attempt to reach the clouds ended in such terrible confusion and disaster that the world has not recovered from the far-reaching consequences. Some day—after a fearful and world-startling calamity has shocked all humanity, people will return to the good old and safer habit of building on the earth rather than up in the air. The United States are large enough to afford plenty of room on the "main floor" for all their population and business requirements, and when the day comes that municipal, state or national authority—as it will come—enacts laws restricting the height of buildings to reasonable limits, and while towns and cities may cover a larger area than at present—population considered—the facilities for communication and business and other purposes will have become so improved, extended and added to, that the present system will disappear or give way to a vastly better one from every point of view. Let us return to a sane method of building, cover more area, place our buildings on good and ample bottoms, "soar less and spread more," then Mother Earth will not be so apt to shake your reasonable structures from off her bosom.

Already a movement has commenced in quite a number of thriving towns and cities for the restriction of buildings to some given standard. This is as it should be, and we are inclined to believe that in a very short time the larger cities, where large numbers of cloud-piercing buildings are much in evidence, laws will be enacted by which buildings will be kept down to a fixed height. What that height will be we are not prepared to say. The new city of Regina, which recently suffered from a cyclone, has made one hundred and twenty-five feet from the street grade the limit. This is more than the Romans allowed, for we are told by Seneca "that in his day the height of houses in crowded Rome was so great—though limited by law to seventy feet—that it was impossible to extinguish fires when once started." In New York a serious effort is being made to regulate the height of buildings in the city, and it is very likely a commission of fifteen will be appointed by the board of aldermen to investigate the matter and report the results of their labors. It is hard to tell what may come out of the investigation, but the movement is an evidence of an unrestful feeling of a portion of New York City's authorities at least. The chief arguments for high buildings are a good advertisement for the banks, insurance companies or trusts that build them, and that owners of land in the downtown quarters have to build high structures in order to get returns for the vast sums sunk in the land. If skyscrapers become general, their value as advertisements will be greatly lessened, for new records will continually be made, just as the Woolworth building in New York, with its fifty-five stories, smashed the record of the Singer and the Metropolitan buildings.

* * *

The prevention of the erection of buildings above a certain height would do much to stop a concentration of land values at certain strategic points, and would spread them uniformly over a wide area. In New York land values in the skyscraper district are fabulous, while a few blocks away on the East Side are slum districts that would be just as valuable as sites for office buildings were a demand created for them by a limitation of the height of such structures. The same condition will undoubtedly develop in other cities if council and owners give free rein to builders. Public opinion seems to be ripening in the direction of the application of a regulation generally enforced in Great Britain—namely, that no building shall be higher than one and a half times the width of the street on which it stands, and that will limit the average height to about nine or ten stories.

Novel Patio School House

By HORATIO F. STOLL.

IN these days when the question of light and air and safety is the main consideration in the planning of new school houses, the tendency in the smaller cities of California, where land is still comparatively cheap, is more and more toward the rambling patio building which insures these three important features.

The wisdom of this innovation was impressed on me the other day when, gazing from the tower of the courthouse at Madera, I beheld stretched out almost at my feet, the "H" shaped Lincoln Schoolhouse basking in the sunshine in the midst of eight acres of lawns and playgrounds. In one patio yard the girls were playing, while in the other the boys were enjoying a ball game.

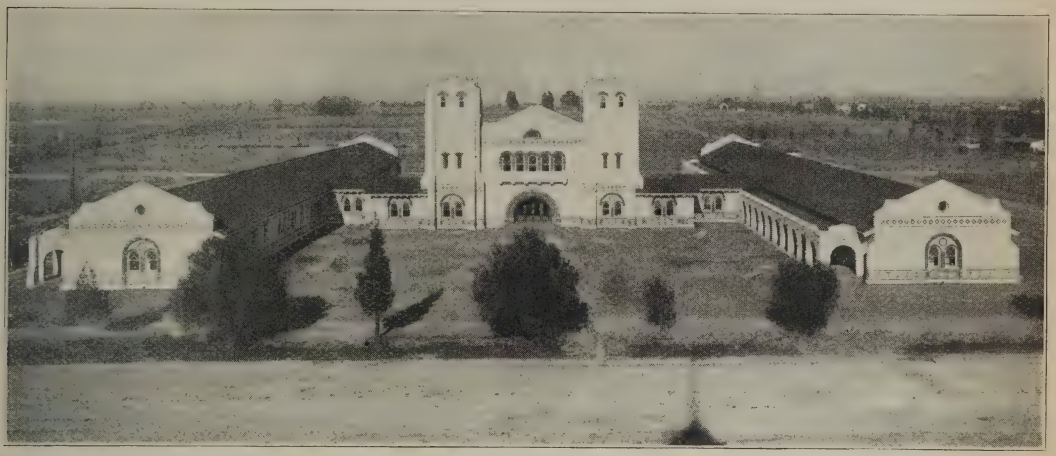
The structure is of white pressed brick, trimmed in red; the roof is red tiled; and the cloisters running around the two inner courts, serve as valuable means of protection to the children. In the summer, the welcome shade modifies the heat, while in the winter, the rain and wind are kept out. Each wing, which is 224 feet in length, contains seven school rooms, 24 by 32 feet. An Assembly Hall runs across the center, while on the floor above, between the two towers, is the library. The building, I was informed, cost $56,971.

All the schoolrooms face on the patios and in case of fire, they can be emptied almost instantly. The arrangement of the rooms is also a big advantage in assembling the children since each class is able to form separate lines in the patio and march into the respective rooms independently, thus saving time and preserving better order. The same thing is true when the children are on their way to the assembly hall. They march along the cloister in two lines on each side of the patio and enter four abreast, without the slightest confusion.

The floor plan shown below was designed by H. F. Starbuck, of Fresno, for a location on the southern coast of California, where the season of summer is long, and there is very little of what could be called winter

weather. It would be impractical where snow and stormy weather is the rule, as the connections between the school rooms and the study or assembly hall are only by way of the porch which is open as shown in the picture. For the southern portion of the usual excavation, which is merely a dirt hole, filled with decaying matter, and which is sooner or later a source of disease.

It will be noticed that the somewhat debatable feature of unilateral lighting, has been entirely ignored in this building, it



western coast of the United States, or the Southern States, it is well suited.

Mr. Starbuck's plans were arranged for a high school, but grammar school buildings have been built according to the same general plan, with the large patio toward the south. This gives all the rooms a full allowance of sun and air at all seasons.

The building is erected "on the ground," that is, there is only a single step to the porch, and the only excavation is for a heating apparatus under the patio. It has a concrete floor under the whole area, and the floor is laid directly upon this, a method which would not be practical in low or wet ground. In this case, however, it avoids the being the design to make it as nearly as possible an out-door school, and the experience of the nearly ten years it has been in use, has been most satisfactory to the teachers and scholars.

The building was built of brick, cemented on the outside to give it a sort of Mission effect, and the result is most pleasing as well as practical. The accommodations of the plan are sufficient for the ordinary high school, but the patio could be enclosed, by a line of rooms across the end, which could be devoted to manual training, or physics, and the enclosure be made into a garden forming a most ornamental and instructive feature.

Some Problems of the Jobbing Carpenter

By WM. C. A. STEVENSON.

THE VALUE OF THE CONTRACT.

THE jobbing carpenter gets into a tremendous amount of trouble through not having a proper contract with his customer. In fact many have no other than a verbal agreement. While a verbal contract is lawful, the writer has found it to be a very unsatisfactory method, for the reason that, in case of a dispute or lawsuit, the contract must be proven by witness and when an agreement has been made verbally there is too much danger of a misconstruction being made of the true understanding.

Lawsuit and misunderstandings are the one thing to be guarded against. In the writer's opinion there is no better way to do so than to have a definite contract in writing. The ordinary person with whom you have to deal, knows very little about the different methods of doing work or the

various grades of lumber, etc. Consequently, without a definite contract, there is too much room left for dispute, which in most cases means a loss of time and money to the contractor. The large contractor has no worry along this line, as he is working under architects' plans and details, and the architect also draws up the contract on regular

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Wm. C. A. Stevenson

SUPERVISING CARPENTER AND BUILDER

GENERAL JOBBING, ALTERATIONS AND REPAIRS. STORE AND OFFICE FIXTURES A SPECIALTY

MY MOTTO: HONEST WORK AT AN HONEST PRICE PERSONAL ATTENTION GIVEN TO LARGE OR SMALL JOBS

CHICAGO, ILL., July 15, 1912, 191_

Mr.....

No.....

Chicago, ILL.

My dear Sir:

I hereby propose to do work as follows on your property situated No....., Chicago, Ill:-Lay a new maple floor on top of the old one in the kitchen and hall and up to the dining room door. Flooring to be #1 clear maple 13/16" x 2 1/4" face. Put down new quarter round Y. P. Cut off and refit doors and put new thresholds where required. Repair the sink frame and top.

Also do the following repairs to the front porch:-Lay a new #1 common pine floor 1" x 4" D & M. Put 2 new 5" x 5" newel posts on platform (solid fir, bored). Repair rails and balusters. All work to be done in a proper and workmanlike manner, for the sum of Forty-four dollars ($44.00), the same to be due and paid in cash when work is complete.

I am to supply all required materials, tools, etc.

Trusting this will prove satisfactory and awaiting your further orders, I am

Very truly,

Wm. C. A. Stevenson

I hereby approve and accept the above proposition and instruct you to proceed with the work with all possible speed.

Dated..... Signed.....

forms adopted by the Architects' Association.

The writer is addressing the jobbing carpenter, who has to be his own architect. The forms used by the architect are not suitable for the jobbing carpenter, as there is too much reading to them. They are drafted for new buildings, not alterations, repairs, etc. They read to the usual person something like the following:

"GIVING" IN LEGAL FORM.

If a man were to give another a lemon, he would merely say, "I give you this lemon." But when the transaction is entrusted to the hands of a lawyer to put it in writing, he adopts this form:

"I hereby give, grant and convey to you, all and singular, my estate and interest, right, title, claim and advantage of and in the said lemon, together with all its rind, skin, juice, pulp and pips, with all right and advantage therein, with full power to bite, cut, suck or otherwise eat the said lemon, or give the same away, as fully and effectually as I, the said John Doe, am now entitled to bite, cut, suck or otherwise eat the said lemon, or give the same away, with or without its rind, skin, juice, pulp and pips; anything hereinbefore or hereinafter, in any other deed or deeds, instrument or instruments, of whatever nature or kind soever, to the contrary in any wise notwithstanding."—Exchange.

What the writer desires to convey to the reader, is the fact that all these legal phrases are not at all necessary to the making of a legal contract. On the contrary, the simpler and easier to understand the better.

The plan the writer has adopted is to make the proposition for the job serve as the contract. I am showing herewith a copy of a proposition made for a small job recently, which may give some idea how to word it:

When I am asked to give a price on a certain piece of work, I make out my proposition in triplicate. I keep one copy and send two copies to the prospective customer. If it is acceptable to him and he wants me to proceed with the work, he signs his acceptance on the bottom of one and returns it to me. This constitutes as good a legal contract as could be drawn up by any lawyer, the very fact that your customer holds a copy inspires confidence in you, as you have put down on paper what you are going to do for him. Also, the majority of people, when they sign their name to a document, feel more duty bound to live up to its terms.

When it is possible to do so I also make details for the work as described in my previous article, in which case it is not necessary to explain so definite in your proposition. It is not necessary, however, to make details in every case, but it is all important to make your proposition in writing, clearly defining what you propose to do, for a given amount of money.

Treatment of Hardwood Doors

By A. ASHMUN KELLY.

WHEN we speak of hardwood finish, whether doors or trim, the idea of paint never enters for consideration, although it sometimes occurs that such wood is painted. When an exterior door is finished it is done in the same manner as an inside door, the exception being in the final coat which must be of a different varnish, spar varnish usually being employed, though a good coach varnish is sometimes used. Spar varnish is a harder and tougher varnish than coach, and carries less oil, hence is more durable under great wear. It also has a better and more lasting lustre.

The treatment of a hardwood door will depend upon the nature of the wood, whether close or open grained. The former will require no paste filling, the latter will. Usually outside hardwood doors are liquid-filled, that is, a liquid filler is applied for the purpose. Shellac also may be used, in place of the liquid filler. Neither is in a strict sense a filler, but merely a surfacer. It saves a coat or two of varnish and the time of application of those coats. Shellac will make the easiest surface to sand smooth, liquid filler being rather difficult to sandpaper.

The woods requiring paste filling are: Ash, beech, butternut, baywood, black walnut, chestnut, elm, mahogany oak and rosewood. Here is as good a formula for paste filler for these woods as can be had: Mix together equal parts of good coach japan and three parts of raw linseed oil each by weight.

Add finely pulverized silica sufficient to form a paste, and mix very thoroughly. Color to suit color of wood.

It may be said here that the natural finishing of hardwood doors, exterior, is not at all satisfactory from the painter's standpoint, for it is very difficult to get a varnish that will stand for any extended length of time, the varnish, even of the high-grade kind, sometimes breaking down within a few months. Here is a method recently given by a Canadian master finisher: Apply a coat of hot raw linseed oil as a primer; follow this with several more coats of raw oil, applied cold and well rubbed in. In the first two of these coats add a little turpentine, which will assist the oil to penetrate. Be sure to leave no oil on the surface of the wood, but rub all off clean. When dry apply a coat or two of raw oil with some waste or a rag, leaving some oil this time on the surface. This treatment is claimed to give better wear than any varnish coat. The method has long been advocated and practiced by painters or grainers for painted or grained doors exterior for a long time. The finish may be brightened up with oil at any time, and the soft, dull effect is very pleasing. Of course, this treatment will ensure almost perfect wear.

In no case should an outside door of hardwood be varnished and rubbed to a polish or without lustre, for the rubbing will seriously affect the durability of the varnish by removing its protecting film of oil, and so permit the entrance of moisture to the foundation, causing speedy decay of the varnish coat.

One of the worst troubles the painter meets with in the exterior door of hardwood with natural finish is the stains caused by water. These are almost impossible of removal, even by oxalic acid, the sure cure for stains in most cases. Where these stains do occur the only thing to do is to scrape down to the bare wood and then apply the acid, strong as possible, which may remove the traces of stain left. The work, if deftly done, may not show any traces, but usually it is best to remove the varnish from the entire surface and do the door all over, from the bare wood. In this case it is usually an advantage to slightly color some oil and rub it well into the wood, even though it has been paste filled, for this will impart a uniform color to the wood and avoid spottiness, which is sure to be after cleaning off. After this the surface may be well rubbed with curled hair or burlap, to remove any grit, and then be revarnished and finished.

In the treatment of the exterior door of hardwood we must take the character of the wood into consideration and finish accordingly. Thus, some woods need paste, others liquid filling. Then the different woods in some cases require very different treatment from woods in ordinary. Take elm, for instance, now largely used, and which is a particularly difficult wood to finish. It has a fuzz, which the finisher calls whiskers, and this causes a muddiness in the staining or filling, by catching the material and forming patches or clouds. There is a special treatment for this, well known to the expert workman. Then elm is apt to be full of sap spots, which will appear lighter than the rest of the surface unless specially treated. Such spots must be stained, after the filling; take some Vandyke brown or burnt umber, in distemper, and with a piece of soft rag go over the spots with the color. If this is done with care the surface will appear uniform of coloring. Take birch, another wood much in use, and we find it very difficult to manage owing to a chemical action which takes place between this wood and most of the stains that are used with it. Owing to this chemical effect the finish in a year or less will appear a dirty brown color.

Shellac varnish is not considered a safe coating on an outside door, under varnish coats. The shellac will, however, hold the varnish much better if rubbed slightly to give it tooth for the varnish. Some doors are finished with wax, but never by anyone understanding the nature of wax, which is easily affected by moisture, water turning it white. Much better to use raw linseed oil, well rubbed. Regarding treatment of veneer doors, now very much in favor, the same course may be pursued as with solid wood, filling and finishing according to the kind of wood used in the veneers. A veneer is, of course, in all practical effects, a solid wood, only that it does not do so well in the presence of much water, which may get under it and so do damage. Also, care must be exercised in sandpapering so as not to damage the fine edges of the wood.

Sanitary Equipment of the Modern Building*

By CHAS. F. SMITH, Consulting Engineer.

(Continued from August number.)

PIPE SIZES:

We give below tables of nominal diameters, areas and weight per foot of pipes used in plumbing work, also a table giving sizes of pipe to use the different fixtures and pipe lines. Cast-iron soil pipe is made in five-foot lengths, which does not include the hub, and cast-iron water pipe usually in twelve-foot lengths.

TABLE OF CAST IRON SOIL PIPE

Inside Diameter in Inches	Area in Square Inches	Weight per foot in pounds	Inside Diameter in Inches	Area in Square Inches	Weight per foot in pounds
2	3.14	5½	6	28.27	20
3	7.07	9½	7	38.48	27
4	12.57	13	8	50.25	33½
5	19.63	17	10	78.54	45

TABLE OF WROUGHT IRON PIPE.

Inside Diameter in inches	Area in Square inches	Actual Outside Diameter	Thickness of Metal	Weight Per foot Pounds	Threads per inch	Length of perfect threads
⅛	.057	.405	.068	.24	27	19
¼	.104	.54	.085	.42	18	24
⅜	.191	.675	.091	.56	18	.30
½	.304	.84	.109	.84	14	.39
¾	.533	1.05	.113	1.12	14	.40
1	.861	1.315	.134	1.67	11½	.51
1¼	1.496	1.66	.140	2.24	11½	.54
1½	2.036	1.90	.145	2.68	11½	.55
2	3.35	2.375	.154	3.61	11½	.58
2½	4.78	2.875	.204	5.74	8	.89
3	7.38	3.50	.217	7.54	8	.95
3½	9.88	4.00	.226	9.00	8	1.
4	12.73	4.50	.237	10.66	8	1.05

TABLE OF LEAD SOIL, WASTE AND VENT PIPES

Nominal Diameter inches	Weight per foot pounds	Nominal Diameter inches	Weight per foot pounds
1¼	2½	3	6
1½	3	4	8
2	4		

The 1¼-inch lead pipe is used only for flushing water closets, and it is much better even in this case to use nickel-plated brass flush pipe with a rubber elbow.

The above weights of lead pipe are known to the trade as "D" grade. The smallest sizes of soil, waste and vent pipes to be used are as follows: main and branch soil pipe 4 inches, main waste pipe, 2 inches, branch waste pipe for kitchen sinks 1½ to 2 inches, branch waste pipe for bath tubs 1½ inches, branch waste pipe for lavatories 1½ inches, branch waste for pantry sink 1½ inches, branch waste for lead safes and refrigerators 1½ inches, branch waste for wash tubs 2 inches, main vents and long branches 2 inches, water closet vents on 3 or more floors 3 inches, branch vents for traps 2 inches or less 1½ inches. The fresh air inlet for house drains less than 4 inches in diameter, should be same size as the drain; for drains from 4 inches, and for drains larger than 6 inches, not less than 6 inches in diameter.

FIXTURES.

There are good reasons for expending much thought in the selection of plumbing fixtures. In the matter of ornamentation, one may go as far as his means will permit, although it would not generally be considered in good taste to place highly ornamented fixtures in an otherwise plainly fitted bath room. The plain, unornamented fixtures are just as serviceable, just as sanitary and as efficient as the ornamented ones, and much lower in cost. Regardless of ornamentation, the fixtures should be of a material that is non-corrosive and non-absorbent, not easily cracked, crazed or broken, and with perfectly smooth surfaces which can be easily kept clean by flushing; they must also have a liberal supply of water for flushing, and the area of the outlet should not be reduced by strainers or cross bars which will prevent a free scouring of the waste pipe and trap at each discharge of the fixture. Fixtures provided with stoppers must have an overflow of equal area with the outlet, to prevent overflowing the fixture when the stopper is in place. In all porcelain fixtures there are three grades, known to the trade

*These articles were begun in the July, 1912, number.

as A, B and C. The A grade is carefully selected, is entirely free from cracks, crazing or flaws of any kind and is the more expensive; the C grade is the cheapest grade, and, though it is sanitary, is likely to have many

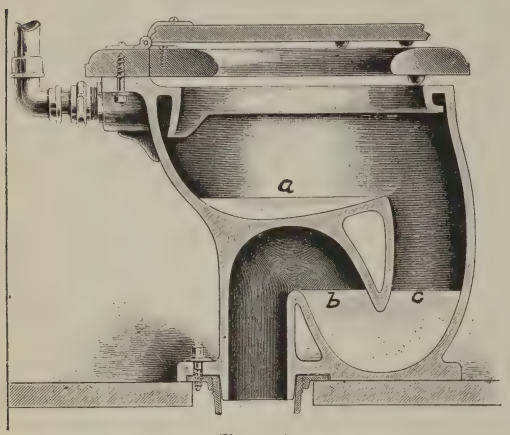


Figure 1.

small fire cracks and other slight imperfections; the B grade of course is between the two in cost and perfection.

It is advisable to set all plumbing fixtures free of any casing or enclosure which will obstruct light and air, it is more sanitary and looks better.

SINKS.

Kitchen sinks are made of solid porcelain, of cast-iron plain, galvanized and porcelain enameled, and of galvanized, pressed sheet steel. The porcelain sinks are the most expensive and have rather a cumbersome appearance, but they are entirely sanitary. The galvanized sheet steel sink is the lightest of any, looks neat, and is serviceable and sanitary, but the sink that is deservedly coming into quite general use, is the porcelain-enameled cast-iron sink, with the back cast integral with it. It is always well to avoid so far as possible any joints about the fixtures, which are liable to collect dirty and greasy water that soon becomes filthy. This fixture always looks well, is easy to keep clean, is thoroughly sanitary and is not expensive. The plain, cast-iron sink is of course, the least expensive of any, but it is also the least desirable.

Kitchen sinks are made in various sizes from 16½ by 12½ by 5 inches deep, to 120 by 22 by 6 inches, but for the benefit of the housewife, we would strongly urge the builder not to install a small sink. In the flats of our large cities, sinks about as large as a wash basin are used, because there is room for nothing larger, but in the house there is room for something better, and it will be found on trial that a sink 43 by 23 by 6 inches deep is none too large and will be greatly appreciated. Use nothing smaller than 36 by 21½ by 6 inches if it can possibly be avoided; the difference in cost is too slight to be considered. It is an advantage to set the sink on brackets from the wall, as the floor is then left clear of all obstructions for cleaning, or for putting down oil cloth, etc.

LAVATORIES.

Lavatories, or wash basins have, in the past, been quite generally made of porcelain, with marble slab, back and apron. This is objectionable for various reasons; the marble is easily stained, and, once stained is never again clean; there are several joints to become foul from dirty water; the bowl is insecurely fastened to the slab, by small clamps with screws leaded into the under side of the slab, which frequently become loose, allowing the bowl to drop away from the slab; the joint between the bowl and slab is made up with plaster, a ready absorbent of dirty water, and the joint between the waste pipe and bowl is generally made up with putty, an unreliable method, and the bowl is often cracked and broken by the

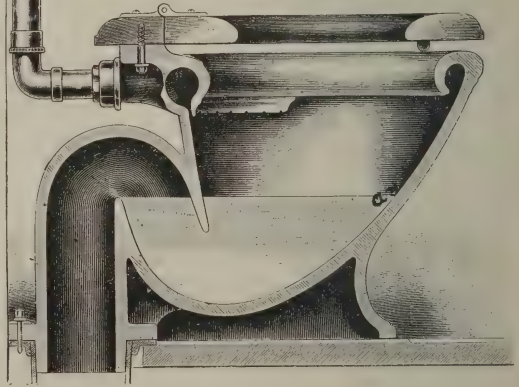


Figure 2.

violent fluctuations in temperature caused by the hot and cold water. As with the sinks, lavatories may be had of all porcelain, and of porcelain enameled, cast-iron, with, or without the back, and with legs or brackets. For reasons previously given, it is well

to have the fixture made complete with back in one piece, and the brackets are preferable to the legs. The all porcelain is heavy, and more expensive, but either style makes a very attractive fixture, and one that is absolutely sanitary without a single objection.

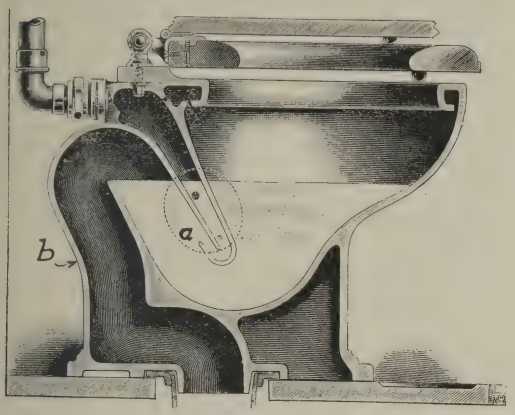


Figure 3.

The overflow from the lavatory is quite an important feature, and should be so arranged, that it may be easily cleaned, as otherwise it soon becomes foul. The bowls are either round or oval in shape, and vary in size from 10 to 20 inches in diameter for the round, and from 14 by 17 to 16 by 21 inches for the oval. The sizes most generally used are 16 inches for the round, and 15 by 19 inches for the oval, set 2 feet 6½ inches from floor to top of slab.

Bath Tubs.

Bath tubs are made in two shapes, the Roman, which slopes at both ends, and usually has the connections at the back, and the French which slopes at one end, and has the connections at the other end. Baths are made of all porcelain, of porcelain enameled cast-iron, painted outside, and of painted cast-iron, with roll rim, or with wood rim; they vary in size from 4 feet 6 inches by 2 feet 5 inches by 1 foot 7 inches deep, to 6 feet 0 inches by 2 feet 5 inches by 1 foot 8 inches deep. If no shower is to be used with it, a bath 4 feet 6 inches, or five feet long is large enough for almost anyone, but if a shower is to be provided, it would be well to have the 5 feet, or 5 feet 6 inches long outside. The porcelain lined, cast-iron bath of the French pattern with roll rim is by far the most popular style, and is generally provided with a nickel-plated combined waste and overflow, and nickel-plated supply pipes from the floor, with double faucets.

Water Closets.

Greater care should be exercised in the selection of the water closet than with any other fixture in the house. A closet should be selected that is free from any moving parts within its own construction; that has an outlet that will readily pass a ball 2½ inches in diameter, that has a deep water seal, and an exposed water surface in the bowl of large area and considerable depth. In some localities, an exposed water surface of less than 28 square inches is not allowed. The bowl and trap should be so arranged that they are thoroughly cleansed at each flushing of the fixture, and the cistern must be one that will supply a large volume of water, suddenly and with force at the instant of pulling the chain, and then more slowly fill the bowl and trap to prevent their being left empty by syphonic action.

Water closets are made of porcelain enameled cast-iron, and of porcelain enamelled earthenware; the latter are the better ones to use. They are usually set 23 inches from wall to front of seat, measure 13 inches wide and about 17 inches high. There are three types of closet in use, made in various styles by the different manufacturers, known as the "washout," the "washdown" and the "syphon-jet."

Many thousands of the "washout" closets are in use because of their lower cost and lack of knowledge as to their unsanitary features by the purchaser, but it is not a desirable closet, and their use will eventually be discontinued. It is shown in section in figure 1. The exposed water surface at *a*, is of large area but very shallow, so that the soil is left exposed to give off offensive odors; because of this shallow water too, it is difficult to cleanse the bowl by ordinary flushing, several flushings generally being required; they are usually made with a front outlet, and the rush of water and soil drives the offensive odors into the room; the water seal shown at *B* is also very shallow and a slight syphonic action from the discharge of another fixture, or a litter evaporation if the closet is not in use for a time, will break the seal allowing free ingress of sewer gas; very often the soil and paper is not fully discharged through the trap, and will lie on the surface at *C* for some time giving off

offensive odors; the closet is also noisy. Don't use it.

The "washdown" closet, shown in section in figure 2, is a much better type, thoroughly sanitary and but little more expensive, they have a large area and depth of water, and a deeper seal than the "washout," the contents of the bowl are quickly and completely discharged, leaving the bowl entirely clean. It is a satisfactory closet except that it is a little noisy. There is another pattern of "washdown" closet not quite so desirable, having the inner surface of the bowl at *a* convex; this reduces the area of exposed water surface, and the soil is liable to collect on this convex surface of the bowl above the water line, making it more difficult to keep clean.

Figure 3 is a sectional view of the "syphon-jet" water closet, so named because the bowl is emptied by syphonic action, started by a strong jet of water under the surface as at *a*, then the constricted, or circuitous passage *B*, becoming filled with water, serves as the long leg of a syphon thus emptying the bowl; the sides of the bowl are washed by a portion of the water passing around the rim. The operation of this closet is nearly noiseless, it has a great area and depth of water, and a deeper seal than the other types, and is in every respect the most satisfactory type to be had.

Never use a water closet of any type with a "vent horn" on the bowl, they soon become broken and are a constant menace.

FLUSH TANKS.

The supply for flushing water closets should never be connected direct to the house supply system, whether from the street main or house tank, but always from a flush tank which may be supplied from the house system. This is because it is necessary to have a large and definite volume of water discharged at a given time, and the flush tank or valve can be readily adjusted for that given volume, and also because, if the house supply should at any time be shut off, the opening of a valve or faucet below the water closet will not syphon foul air or water into the supply pipes, thus contaminating the water supply for the house.

Flush tanks are usually made of wood, copper lined and finished to match the surrounding wood work, or to suit the taste and pocketbook of the purchaser; for cheap work, plain cast-iron tanks painted, are supplied, they range in capacity from 6 to 12 gallons. In large houses in the city, with a comparatively short house sewer, the smaller tank will suffice, as there is always a large supply of water in the soil pipe and house drain to carry away the discharge from the closets, but in suburban and country houses, often with a long house sewer and only one or two water closets in the house, it is better to use the larger sizes. Flush tanks are made in different types of water closet; tanks with syphon valves are generally used for "washout" and "washdown" closets, and tanks with slow closing valves for "syphon-jet" closets; with these tanks, one pull of the chain starts the discharge, and it continues until the volume for which it has been adjusted has been discharged. There is another pattern, with a more simple valve mechanism, which discharges so long as the chain is pulled, and answers for any type of closet; for general house use, this is a good tank to use, as there is really no need to discharge eight or ten gallons every time, if two to three gallons will do the work.

To provide the necessary force to the discharge, the tank should be set at least 7 feet from the floor. In restricted locations, as under a stairway, or low shelving roof, or where a window or some other architectural feature may interfere, it is not always possible to secure the necessary height for the tank; under such circumstances a "low-down" cistern is employed, which is connected directly to the closet without a flush pipe, as it must make up in volume what it lacks in force.

WASH TUBS.

The old style, made up wooden wash tub has long since been discarded as unsanitary. They are now made of cement, stone, slate, porcelain and porcelain enameled cast-iron; they vary in size from 24 to 30 inches in length, by 25 inches wide and 15 inches deep. They are always set on legs, the weight being too great for brackets and measures 32 inches from floor to top of cover As in other cases it is well to avoid joints for sanitary reasons, and use only the one piece tub.

COLD WATER SUPPLY.

In cities and towns, and their suburban districts, water is generally supplied by the municipality, or a water company through street mains, and in country districts, from

wells, streams or springs pumped to a storage tank under the roof or outside elevated above the roof on a frame-work of wood or steel. Tanks inside the house are usually square or oblong in shape and generally of wood, often lead or copper lined. The use of any metal lining for a tank containing drinking water should be prohibited. Water is the greatest solvent known, it dissolves all minerals and nearly all metals to a greater or less degree, and absorbs gases to an extraordinary extent. At atmospheric pressure, 14.7 pounds per square inch, and ordinary temperature, pure water will absorb 4 per cent of its volume of air, and 100 per cent of its volume of carbonic acid gas, and varying volumes of other gasses; an increase in pressure, increases its absorbent capacity in exact proportion.

Its solvent properties vary at different temperatures for different minerals. For the above reasons water which is to be used for drinking or culinary purposes should never be permitted to stand in an open vessel where there is any possibility of its being contaminated by foul gases.

Some waters will attack lead and zinc more readily than others, depending largely upon the amount of free carbonic acid gas present in the water, and as lead is a cumulative poison, and but a very small quantity is dangerous, it is safer to avoid the use of lead pipes, or tank linings altogether, and depend upon galvanized iron or tin lined pipes. The zinc on the galvanized iron may also be dissolved by the water, but it is in very small quantities, and is readily passed off by the human system.

Connections.

Where the water is supplied through a street service, connection is usually made to the house piping with a ½-inch or ¾-inch service cock at the main, and a stop and waste cock at the curb under the sidewalk; a stop and waste cock should also be placed just inside the house.

The sizes of supply pipe for different fixtures depends upon the water pressure, and should be as follows, the smaller size being for the higher pressure:

For baths ½-inch or ¾-inch, for lavatories ⅜-inch or ½-inch, for kitchen sinks ½-inch or ¾-inch. The connection to each fixture should be extended not less than eight inches above the faucet, to serve as an air chamber for the prevention of "water hammer," which always occurs when the motion of a body of water is suddenly arrested, as by the closing of a faucet. Where the water is taken from a well or cistern, it must be remembered that it takes a very good pump, tight pipe and hard work to lift, or draw water to a height of 25 feet from the surface of the water. If the well is deeper than that, it is better to use a deep-well pump placed at or below the surface of the water, when the water may be forced to any height desired.

If a well or cistern, or both and a cesspool are to be used, care must be taken to build the cesspool as near watertight as possible and place it a considerable distance away from the well or cistern, and it must not be less than 20 feet from the house. If the ground slopes down in any direction from the house, it is advisable to place the cesspool at the lowest grade possible. It is impossible to exercise too much care in the protection of the water supply from contamination.

Hot Water Supply.

Water is usually heated for the house supply in a cast-iron "water back" in the kitchen

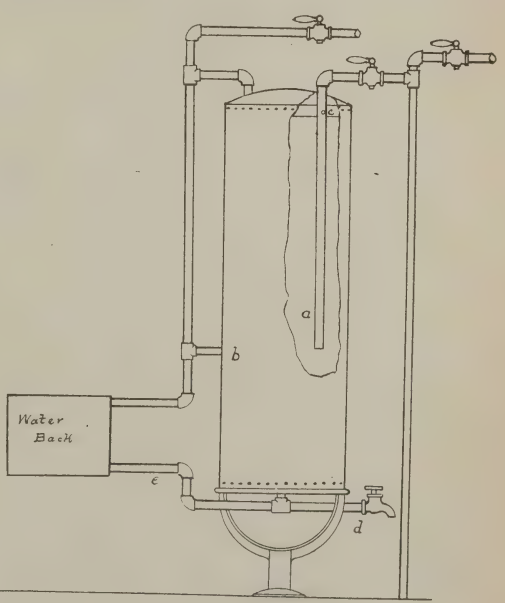


Fig. 4

range, and stored in a cylindrical tank placed in the kitchen near the range. This is occasionally supplemented by a tank heater in the laundry, used also to heat the laundry

irons, or by a gas heater, in the summer months when the range may not be in use.

The kitchen tanks or boilers are of sheet copper tinned inside, or of galvanized sheet iron, galvanized inside and out after riveting, and are made for pressures from 150 to 250 pounds per square inch. Copper boilers, though lasting longer under proper conditions, than iron boilers, unless reinforced inside, are liable to collapse by the atmospheric pressure, if the water should be syphoned out of them, as occasionally occurs. It is safer to use boilers that have been tested for 250 pounds pressure, and never use a check valve on the supply pipe, then if the pressure should become excessive, the water will be forced back into the main, saving the boiler from bursting.

Kitchen boilers are made in many sizes up to 200 gallons capacity, but the usual size for an ordinary house with but one bath is 14 inches diameter by 5 feet high, with a capacity of 40 gallons; each additional bath would require additional capacity of about 30 gallons.

The connections from the "water-back" to the boiler giving the best results are shown in figure 4. The cold water supply pipe *A*, of brass should not extend below flow pipe connection *B*, and should be pierced by a hole at *C*, equal to ¼ the area of pipe *a;* the object of this being to break the syphon in case one should exist at any time, before the water has been syphoned from the "water-back."

In cases where the supply is from a tank, an expansion pipe should be extended from teh hot water pipe, to a point above the tank, where it should be turned down to discharge into the tank. A blow-off cock must be provided with each boiler as at 2, to draw off the sediment, or for emptying the boiler when necessary.

In many localities, particularly along the Mississippi valley, the water is very hard, caused by its having absorbed large quantities of lime or magnesia salts in its passage through these minerals. When the water is heated, these salts become insoluble, and deposit in the form of scale and sediment on the inside of the "water-back," soon choking it up. To prevent this and soften the water, it is necessary to add some chemical, usually soda ash. This can be readily done through a small, inexpensive apparatus made for the purpose, inserted in the return pipe *E*, between the "water-back" and boiler.

Stucco for Exteriors

THE most durable stucco is obtained when cement is employed, but the trouble lies in the fact that cement sets quickly, much more quickly than lime, and cracks are liable to appear, says The Builder. If, however, just—with the accent on the word just—sufficient of each ingredient is used, and neither too little nor yet too much water is added, a stucco can be produced that is far superior to any other in weathering powers. If an excess of water is employed the plaster will not cling properly to the wall; yet, on the other hand, if too little be used, the cement plaster will dry so quickly that cracks are certain to result. Again, if too much cement is used cracks are liable to appear. Dryness in any form results in cracks, which in some cases are so fine as not be to discernible except by close inspection. These cracks will in time admit moisture, rain bearing sulphur and ammonia, which will in time break down the protective covering, and the stucco will fall away, either by disintegration or peeling.

One essential, therefore, to good work is that the plaster must not lose its dampness too rapidly, and this can be done by keeping the surface wetted or by way of damp cloths hung in front of the wall. It is also necessary to prevent the water in the cement being absorbed by the brickwork on which it rests, and this can be done by previously well wetting the brickwork.

To make a good weather resistant, the stucco must be dense. This can be obtained by mixing the concrete stiff, and yet contain the necessary water to prevent rapid drying, which will allow the plasterer to work rapidly. A very thorough mixing will accomplish this. Trowelling the surface should not be done too much, for although by this means density is accomplished, the result will only be the trouble of cracks when dry, which is to be avoided. Trowelling brings the water to the

surface, and the work is liable to dry too rapidly.

The proportions of the various materials used is debatable. Whether the first or last coat should contain the most cement has to be considered from two points. The first coat, it is argued by some, should be the one containing the greatest percentage of cement, as it has to bind to the wall and support the outer coats. On the other hand, the last coat is the one attacked by the weather, therefore it should have the greater amount of cement is argued by others. Unfortunately, the greater the percentage of cement there is all the more tendency to crack, and unless great care is exercised a high percentage of cement is likely to produce this undesirable result. A medium per centage is therefore the best in the long run. Thus the coats—three are recommended, as two coat work is little more than ½ in. thick—may be composed of one Portland cement to two of clean, sharp sand. This for the first two coats. The finishing coat may be composed of Portland cement, sand, and clean, sharp gravel. As the cement is liable to expand during wetting and contract whilst drying the precautions previously mentioned should be taken. Lime stucco is preferred by some, because it is not liable to this trouble.

The sand and gravel must be sharp. Many a failure is due to the non-observance of this. Earthly matter or organic substances not only chemically combine with the cement and break down the stucco, but they prevent the cement from mechanically joining with the sand and shingle.

The first coat should be well scored to form a proper juncture with the second. The wall, too, should be properly prepared, well washed, and joints raked out if necessary. If the wall is old and has been exposed to the weather it should be washed down with a weak acid, as, for instance, muriatic acid. This should be done several days before the stucco is applied.

Uneven thickness of plastering should be avoided or cracks will result through uneven drying. Joints should therefore be filled in before the general coat is applied.

Where furring strips are used for the purpose of affixing metal mesh precautions must be taken to prevent danger from them. This arises from the fact that they are liable to split under the influence of wetting and drying at those places where staples have been driven in to fix the metal mesh, and, the mesh becoming loose, the stucco and mesh fall down. By attaching the mesh to the wood strips by galvanized-iron wire tied around both this danger is avoided.

A good lap should be given to the mesh joints, or at these places cracks in the stucco will appear. There is a danger in using metal lath where some patent plasters are used, as some of them contain acid, which attacks the metal. It is desirable, therefore, where such are used to give the mesh a coat of limewash or some similar protective coating.

Where lime is used with cement the limit should be 10 pounds of hydrated lime, to one bag of cement, and this should only be used for the second coat. The first and last coats should not contain more than 5 pounds per bag of cement; in fact, it were better to use none at all in the finishing coat. Only hydrated lime should be used, and no plasterer's putty. Hydrated lime is lime scientifically prepared, being properly cleansed and screened, and is free from all impurities. A good substitute for sand is asbestos rock and fibre. The fibre performs the binding function of ox-hair in plastering, the stucco being less liable to crack. The use of asbestos fibre along with cement and sand can be recommended. Other aggregates, such as crushed marble, finely-crushed granite, and similar rocks are used where some special finish is desired.

To obtain a rough-cast finish, mix one part hydrated lime with two of Portland cement, mixed dry, and add water until a thick paste is obtained. Put this into a pail, and, keeping it well mixed, take out by means of a paddle or trowel, which, dashed against a stick held in the other hand, splashed the mixture on to the wall, giving the rough-cast finish.

Pebble dashing is composed of clean-washed pebbles mixed with a thick paste of the composition above. This gives a pebbly surface to the work. To obliterate any streaks showing after the finishing coat has been put on, a lime-cement wash can be used, which at the same time will fill in any cracks. To obtain a float finish, the surface is treated with a hand float in the ordinary way for plastering.

If tinting is to be done the coloring matter can be added to the cement-wash just mentioned, but the result is not so lasting as pigments mixed along with the stucco. Free lime in the concrete when moist chemically combines with many of the ordinary color pigments, and also attacks any organic matter in the plaster. The use of paint, therefore, containing linseed oil should be avoided. The percentage of coloring matter to be added to the plaster depends upon the tint required. This may be a source of danger, because a high percentage of some pigments weakens the plaster. Yellow ochre can be added up to 8 per cent, and gives a bright tan color. Yellowish brown or buff can be obtained from 5 per cent yellow ochre and 2½ per cent of permanganate brown. Black shades are obtained by using a small percentage of lampblack or carbon. For red, red oxide or iron are the only colors that can be safely employed. A strong, highly-priced oxide, whereby a small percentage only is necessary, is better than a weaker, cheaper grade. Black iron oxide will give a bluish shade of black. Brown is a color not readily obtainable except at the expense of the plaster's strength.

Iron oxide can be used; the lime in the concrete acts on ferric chloride or ferric sulphate, giving a reddish-brown color—a deposit of ferric hydroxide; but to obtain this 20 to 30 per cent by weight of coloring matter is required. Green is another color difficult to obtain. The only green pigment that will stand the lime action is chromium oxide, which is an expensive mineral pigment. The coloring values of the cheaper grades are very low. By mixing blue and yellow, green can be produced, but the trouble is to obtain a good strong blue that will withstand the lime. A good blue is ultramarine blue, but it has a very poor coloring power when mixed with other pigments. It will, however, stand the action of the lime.

The Necessity of Pure Air in Our Homes

By ARTHUR C. CLAUSEN, Architect.

EMINENT physicians claim that all diseases has its origin either in our minds or in our homes, and that the majority of those that come from our homes are due to a lack of fresh air. To properly ventilate a home there must be a means for fresh air to enter and for the used air to escape. This can be accomplished in a natural manner with no force draft. The hot air plant solves the problem of fresh air supply if properly installed, but it has many objections which make it less desirable as a heating plant than other systems. In order to allow the heat to properly enter with a hot air heating plant and provide a continuous circulation of air, most plants are put in with what is known as a cold air return. A large duct leading from a register in some central part of the house, which is carried down under the basement floor and then to the furnace. This, of course, means a continual circulation of the same air and for this reason this method is not as good as to provide some means for the air to escape into the open and obtain the fresh air supply from out of doors. The objection to this always is that considerable warm air is always allowed to escape with the foul air and the fresh air must be continually heated, requiring a little hotter fire than under the old method, but this slight amount of extra fuel consumed is a very cheap price for extending the lease of life and increasing the enjoyment of living through continued good health. With a hot water plant the modern way to provide a warm fresh supply of air is what is known as indirect radiation. This is obtained through placing what is known as an indirect radiator especially made for this purpose, enclosed in a galvanized iron compartment, located under the first floor, this metal compartment being connected with the floor above. Since heat invariably rises, carrying a current of air with it, the upward current pulls in through the fresh air duct a fresh supply of air, which circulates through the indirect radiator and becomes warmed and then passes into the room. The register can be either placed in the floor or in a partition. If there is no fireplace on the first floor connected with rooms that open together and the damper is left open, this will serve as a splendid ventilator, no other outlet being

necessary. The baseboard ventilators consist of small nickel-plated regulators connected with a three and one-half inch tin or galvanized tube which is carried down the outside walls into the basement, across the ceiling of the basement, connecting into the main ventilating pipes leading into a vent flue into the chimney, which should be immedately beside the furnace flue. The air on the floor being the coldest and also what is known as the dead air of the room will follow a downward current through this vent pipe. The pipe being placed in an outside wall and cold its entire length insures a downward current of air until it gets into the basement. Here it is connected with a flue that is warm, and the current goes upward, carrying the air with it out of the chimney at the top of the house. While there are hundreds of patent devices on the market for the ventilation of homes, the above described method is the simplest and most practical manner in which it can be accomplished. It seems a light expense in equipment and a little more heat, but the expense will be offset by a saving of doctor bills, to say nothing of the comfort and pleasure of living in a well ventilated, sanitary home. This extra cost for fuel on account of the indirect would not exceed the cost of a ton of coal a year in a cold climate, and one-half a ton in a mild climate. No man would hesitate to spend from $4 to $8 a year to insure his family against illness in any other way. Therefore, he is a short-sighted business man, to say the least, who would not adopt a means so simple to insure the health of himself and family and save doctor bills, unless he knew nothing of the simple way which a warm supply of fresh air can be obtained. To be effective and to cost the least for maintenance, the plant must be put in strictly in accordance with the laws of nature. The oxygen in the air when heated rises, this being one of its lightest elements. The breath when exhaled is practically free of oxygen, but contains most of the other elements in the air, being, in addition to this, laden with body gases and poisons, moisture and some animal matter. This air is heavy, and settles down toward the floor. Since the warm air rises, the coldest air in the room is also on the floor. From this can be seen that the warmest and freshest air in the room is near the ceiling and the foul, cold, dead air is near the floor. The point one-half way between these two, where we do most of our breathing, being a mixture of both. The warm, fresh air supply when brought into a room rises immediately. In order to make room for it there must be an exhaust in the room or in a room adjoining, and this should be placed near the floor to exhaust the cold and dead air. It is on this simple principle that modern theaters and churches abandoned the idea of placing ventilators in the ceiling, and instead placing a little exhaust under every third seat in the parquet and under the pews on the main floor. This drew the fresh air down to the breathing point. When this policy is reversed, and the exhaust placed near the ceiling, as has sometimes been done in the past through ignorance of nature's laws, the oxygenized air, which is the warm air of the room, is exhausted first, and the dead and cold air on the floor has a tendency to rise, bringing it up to the breathing point. In this way, however, some ventilation is provided, but at an extra cost for fuel through a waste of heat. Where there is an outlet, there should also be inlets. The warm air, expanding, goes out the ceiling flue readily, which causes a suction, and brings the cold air in through windows and cracks, if fresh warm air is not supplied from some place in the house. This drawing of cold air and exhausting of warm air at the ceiling has proven an increase in the cost of maintaining the heating plant. From this it can be seen that the only logical place for the exhaust pipes is near the floor in the baseboards. Fresh air is the cheapest and most harmless commodity which nature gives us, still many people regard it as a natural enemy. They shut themselves into a room, carefully sealing up all openings and breathe the fetid air over and over again, taking into their system again poisons exhaled from their lungs. The law in most cities requires certain means of ventilation for churches, theaters, schools, dance halls and other places where people congregate in large numbers in a small place; but in the private home it is optional whether a man should provide means for ventilation in it or not. The means by which a home can be properly ventilated are so simple and so inexpensive that there can be no excuse for their not being adopted.—The Furniture Journal.

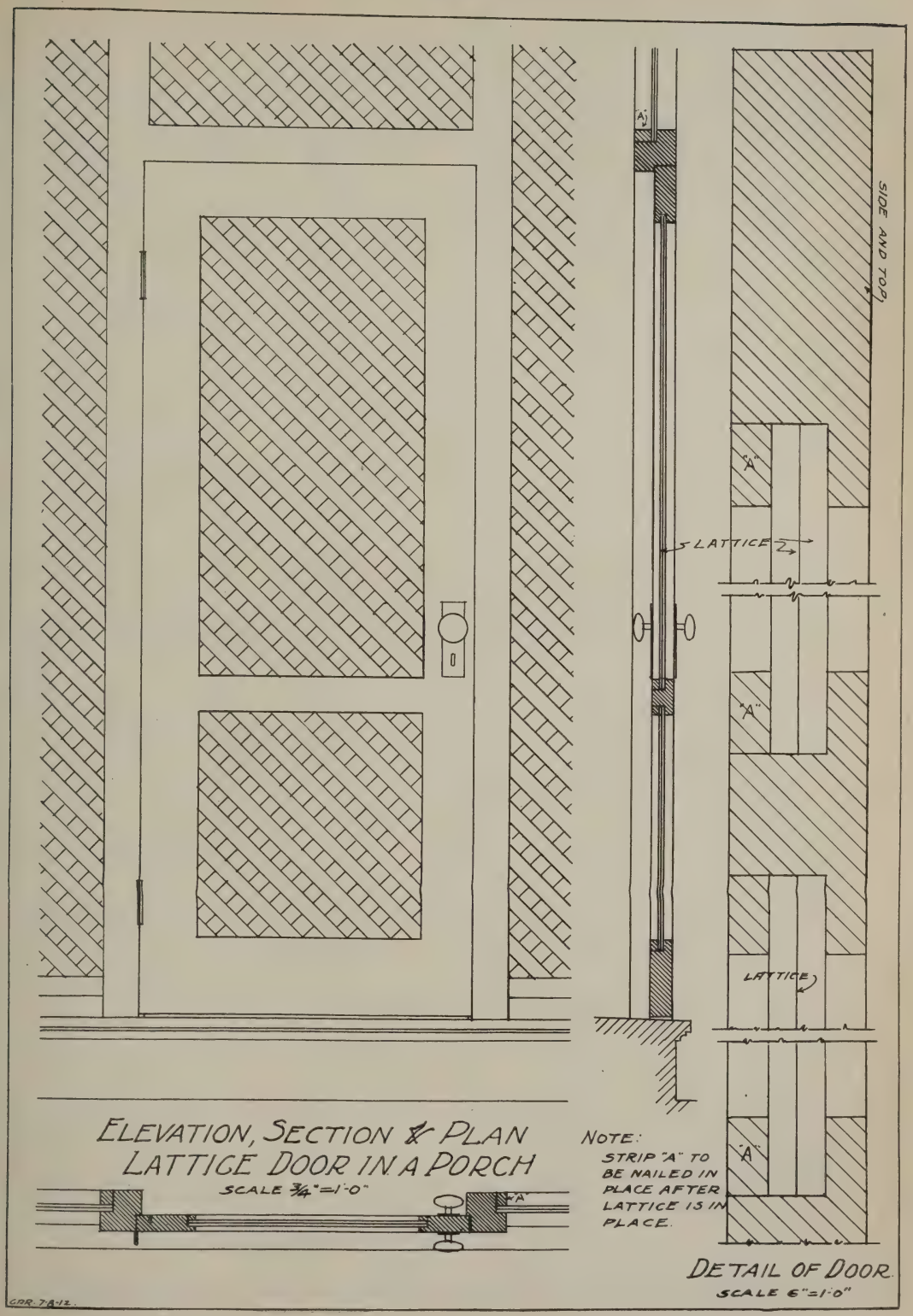
Miscellaneous Details

By CHARLES P. RAWSON, Architect.

A subscriber in a recent letter asks that we present a detail of a lattice door for a porch, suitable for a mortise lock. The only special requirement for a door of this kind is to have the side stile of sufficient thickness and width to allow mortising for the lock. When it is thick enough for this it is too thick to allow the nailing of the lattice strips on to the back of the same, as is usually done. The rails and stiles of the door have therefore been rebated for the strips and after they have been placed in position, another strip "A" is nailed in place all around the panels of the door. This same arrangement has been used in securing the lattice to the posts of the porch. This makes a neat job on both the inside and the outside. Screened porches have so thoroughly taken the place of lattice porches that they are but little used of late years. The author has seen a combination of the two where wire screen was placed between the two layers of lattice strips. Unless copper wire were used, the life of such construction would be limited and would probably be hard to keep clean. We show an elevation, section and plan of this lattice door drawn to the scale of three quarters of an inch equals one foot and a detail of the door itself at a scale of six inches equals one foot. The upper part of this detail applies to both the top rail and the side stile which will contain the mortise lock.

Another subscriber has asked for the working details of a combined buffet and china-case. We take it that he desires one not too expensive and one which is to be set back into the wall. We show drawings of such a case drawn to the scale of three quarters of an inch equals one foot and elevation, section on center line, and half plan through the upper and lower parts of the case. A case of this kind would be completely made at the mill and set in place at the building and cased to match the balance of the inside finish of the room. The upper part of the case has leaded glass doors and contains two shelves which could be made movable if desired, although it is hardly necessary. These shelves could be either of wood or plate glass. The center portion of the buffet is set with three beveled plate mirrors. The lower part contains four drawers and two cupboards with wood paneled doors. The top drawer, extending the entire length of the case, is for table linen. The front is made to conform to the projecting front of the base of the case. The entire work should be finished in the same manner and supplied with hardware to match the balance of the room in which it is placed.

The last detail this month is of a wardrobe which may be used in a bedroom or an office. An affair of this kind will take up much less space than an ordinary clothes closet, and will give a great deal more room for the storing of garments, give easier access to them, be more readily kept clean and is better in every way. A wardrobe should be made to harmonize with its surroundings, as to finish. The inside should be finished in natural wood or painted unless it is lined with cedar, which is an excellent thing to do, in which case it should be left unfinished. The drawing is to a scale of three quarters of an inch equals one foot and shows an elevation, section and plan of a wardrobe with two five-cross paneled doors and two drawers for shoes, etc. A pole is fixed near the top of the case and provides room for any number of coat and suit hangers. An ordinary curtain pole will do for this feature. Hooks are also provided at the back. If the plan is arranged for it, wardrobes may be set into the wall flush, as is shown for the buffet. If this is done a small ventilator may be provided at the top and connected with the spaces in the wall back of it and carried up through the building. Doors for a wardrobe should be fitted as tight as possible without sticking.

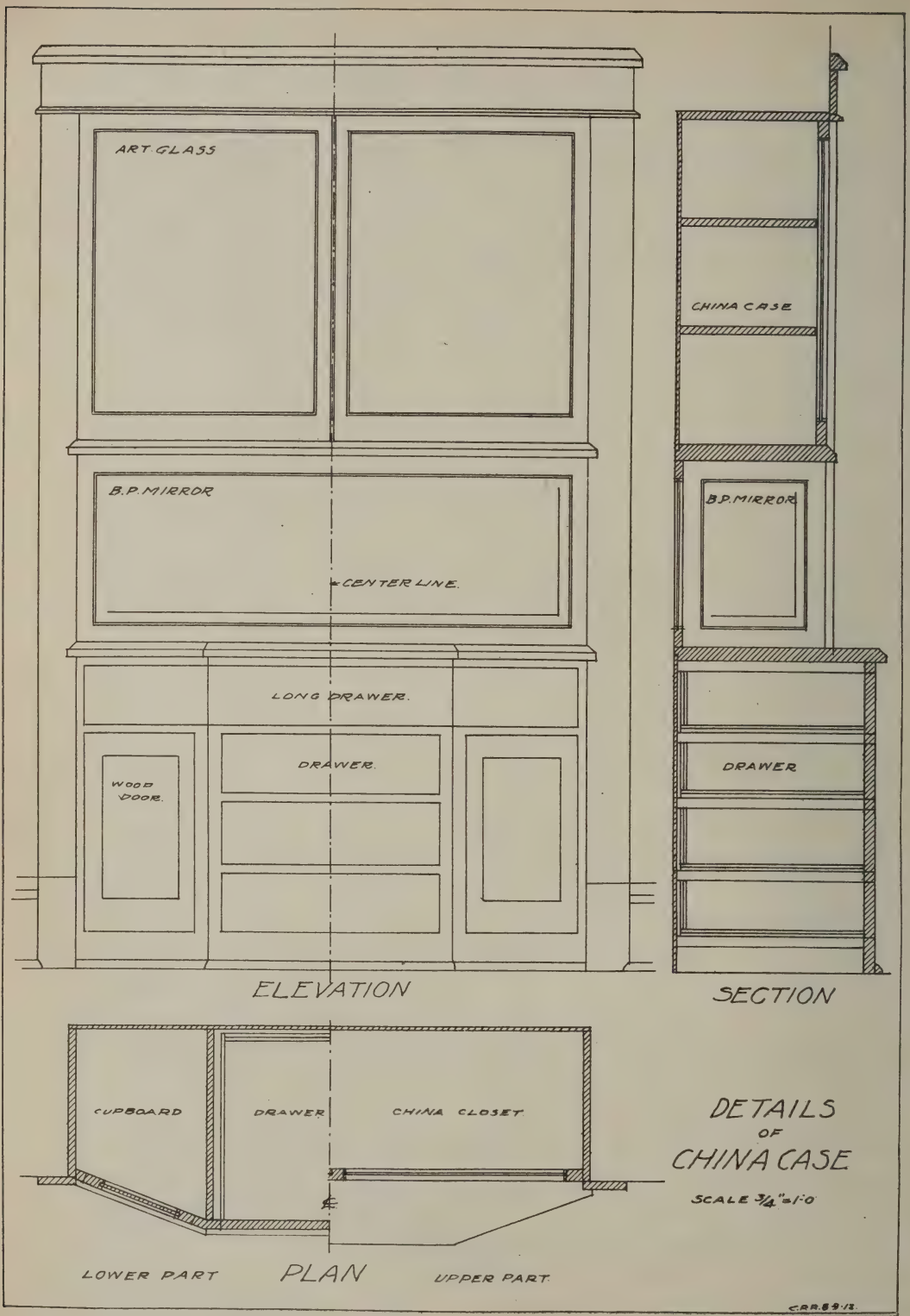


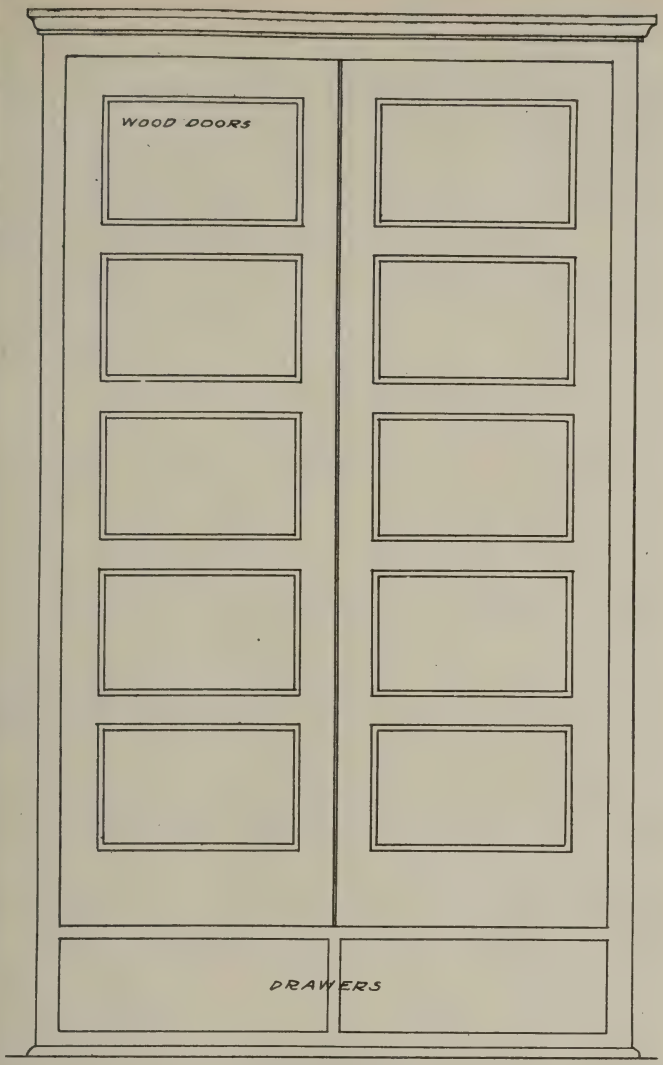
ELEVATION, SECTION & PLAN
LATTICE DOOR IN A PORCH
SCALE 3/4"=1'-0"

NOTE:
STRIP "A" TO BE NAILED IN PLACE AFTER LATTICE IS IN PLACE.

DETAIL OF DOOR.
SCALE 6"=1'-0"

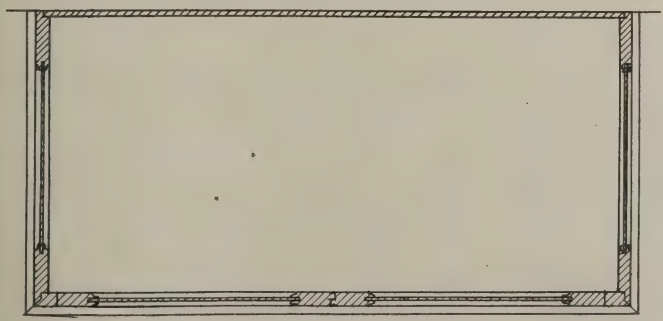
GDR. 7A-12.


ART GLASS
B.P. MIRROR
CENTER LINE.
LONG DRAWER.
DRAWER.
WOOD DOOR.
ELEVATION
CHINA CASE
B.P. MIRROR
DRAWER
SECTION
CUPBOARD
DRAWER
CHINA CLOSET
LOWER PART
PLAN
UPPER PART
DETAILS OF CHINA CASE
SCALE 3/4" = 1'-0
C.R.R. 8-9-12.



ELEVATION

SECTION



PLAN

DETAILS OF WARDROBE

SCALE: 3/4"=1'-0"

C.P.R. 8-9-12

How the Contractor Can Profit From Newspaper Advertising*

By IRWIN SPEAR.

OF ALL the advertising mediums that the contractor and builder can use, it is safe to say that the newspaper heads the list for result-getting. And dollar for dollar of cost, it will be found in nine cases out of ten, the most economical.

The newspaper is to the small town or city what the magazine is to the national field. It offers the contractor the same service in a local way that the magazine performs for the manufacturer, covering a single, clearly defined group while the magazine covers many and widely scattered groups.

Like the magazine, the newspaper has back of it a "constituency"—its readers. Herein lies its value from an advertising standpoint. It stands for certain principles. It is the "organ" or mouthpiece of classes or parties and its views are in harmony with the views of individuals in that class or party to which it caters. On this account it frequently happens that a newspaper has value as an advertising medium quite apart from the size of its circulation. As an illustration of this fact, take the New York Evening Post, which with a circulation of only about 26,000 is the recognized financial medium of all metropolitan newspapers. Why? Because its readers are almost without exception, bankers, brokers and the conservative monied men of New York. What is true of the Post is true in one way or another of newspapers all over the country—even in your own town. One of your local newspapers may have a much smaller circulation than the other—or others if there are more than two. It does not necessarily follow that because fewer people read it, it is the least desirable advertising medium for you. The quality of its readers may be such as to make it by far the best.

Remember then, in buying newspaper space that you must consider quality as well as quantity and when a publisher tells you that he has the largest circulation, make him show you what kind of circulation it is.

Granted that the newspaper fills a niche in advertising that can not be adequately filled by any other medium, the question arises, "When shall the contractor advertise?"

William Freeman, advertising manager of the New York Evening Mail, speaking to the average business man, said recently that all the time is the time to use newspaper advertising. However, Mr. Freeman is a newspaper man and therefore prejudiced in favor of the kind of advertising which he sells. My own experience and observation, re-inforced by talks I have had with some level-headed contractors, leads me to believe that Mr. Freeman is wrong.

As I look at the proposition, newspaper advertising is nothing more nor less than news about the business or thing advertised. When you have something to say to the public of actual news value, that is the time to advertise, regardless of whether the time be "knee deep in June" or in the heart of February.

It is questionable whether newspaper advertising "merely to keep your name before the public," is profitable. People buy newspapers because they want the news. You will play safe if you give them what they are looking for. It is a mistake to think that people seek news only in the so-called "news columns." They seek the most vital news of all—that which touches their pockets—in the advertising columns.

That is what advertising news is—anything that touches the pocket—teaches where and how money may be saved, comforts and conveniences gained, life made better worth the living.

Therefore, the fact that you can supply plans and specifications for a modern home and can build it at an economical price, is ad-news. The fact that a man who owns a home is in a better position and enjoys a more contented frame of mind, than he who pays rent, is likewise good material from which to work out newspaper announcements.

In preparing your "copy," use crisp, straightforward facts, tersely phrased. Make every sentence tell. Do not brag. That kind of advertising may flatter the vanity of the advertiser but it carries no conviction to the reader and advertising is successful

*This is the fifth article by Mr. Spear on Business Getting Ideas for the Contractor.

only as it makes the reader want the thing advertised.

Newspaper advertisements should be appropriate to the season. Local events of general interest may sometimes be woven into your ads with good effect. The Old Home Week, Fourth of July, Labor Day, June or October weddings, and various other holidays all can be adapted to the contractor's use and are useful because they infuse a note of timeliness and give news value.

Every contractor who uses newspaper space will find it pays to have a contract with his publisher. He may at some time want special favors and if he is a regular user of space he is more likely to secure the consideration he seeks. Besides, a progressive newspaper, as a constructive force in any community, deserves the support of public-spirited citizens.

The question is often asked, "Is knowledge of type and the technic of printing, necessary in order to make newspaper advertising resultful to the utmost?"

No one will deny the importance of a strong "set up" or layout in newspaper copy but technical education along these lines is by no means essential. The advertiser needs only good sense and good taste. With these two characteristics he can not go far wrong in his advertising.

One of the best types to specify in having your ads set is Caslon. Have the headlines in Caslon Bold or Caslon Bold Italic of a size as large as your space permits. Cheltenham is also an attractive type face. Here are examples of headlines set in the various types mentioned:

This is 36-point Caslon Bold

This is 30-point Post Italic

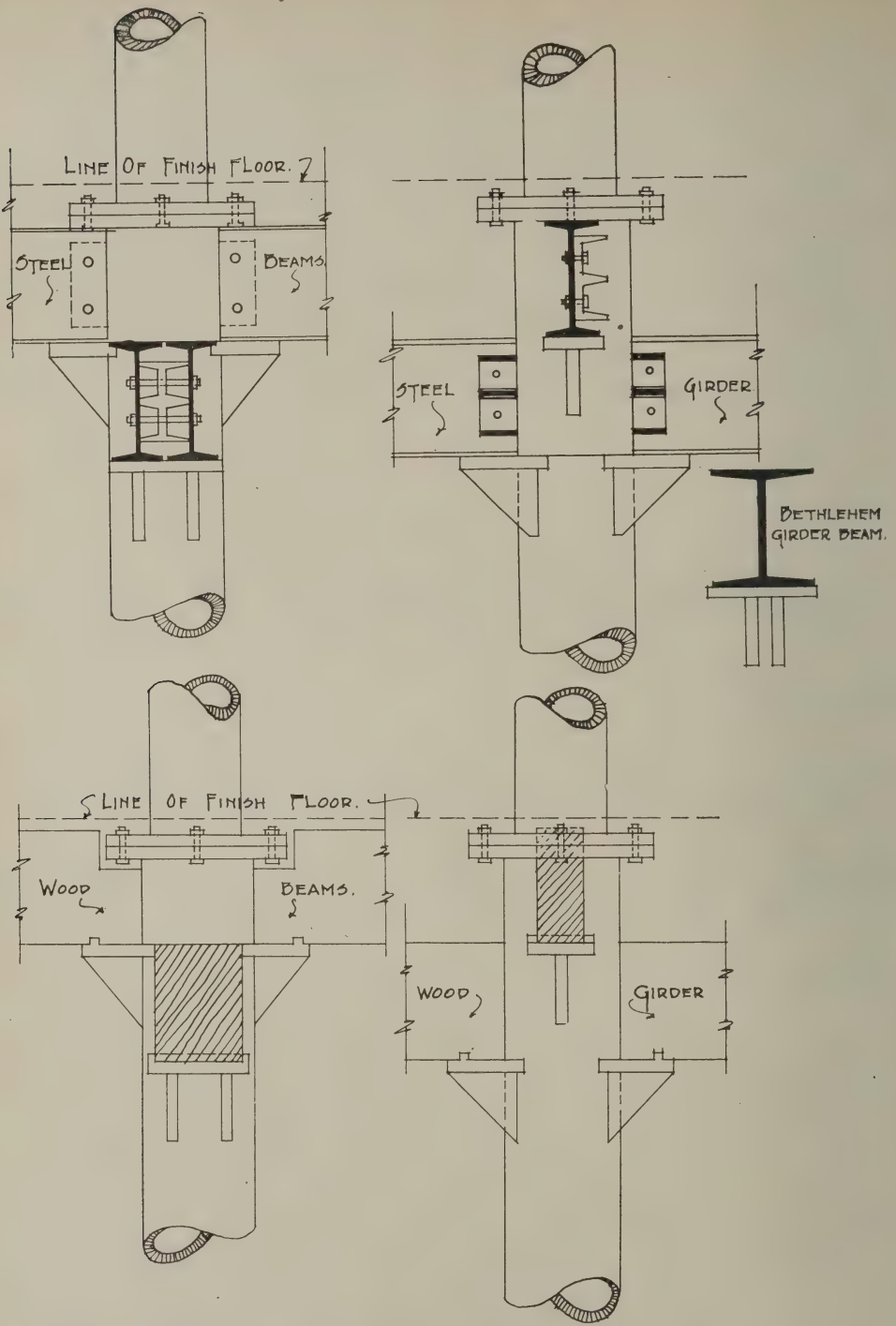
This is Cheltenham Bold

A powerful attention-getter in advertising is white space. A margin of white space around an ad makes it stick out like the proverbial tar spot on a linen duster.

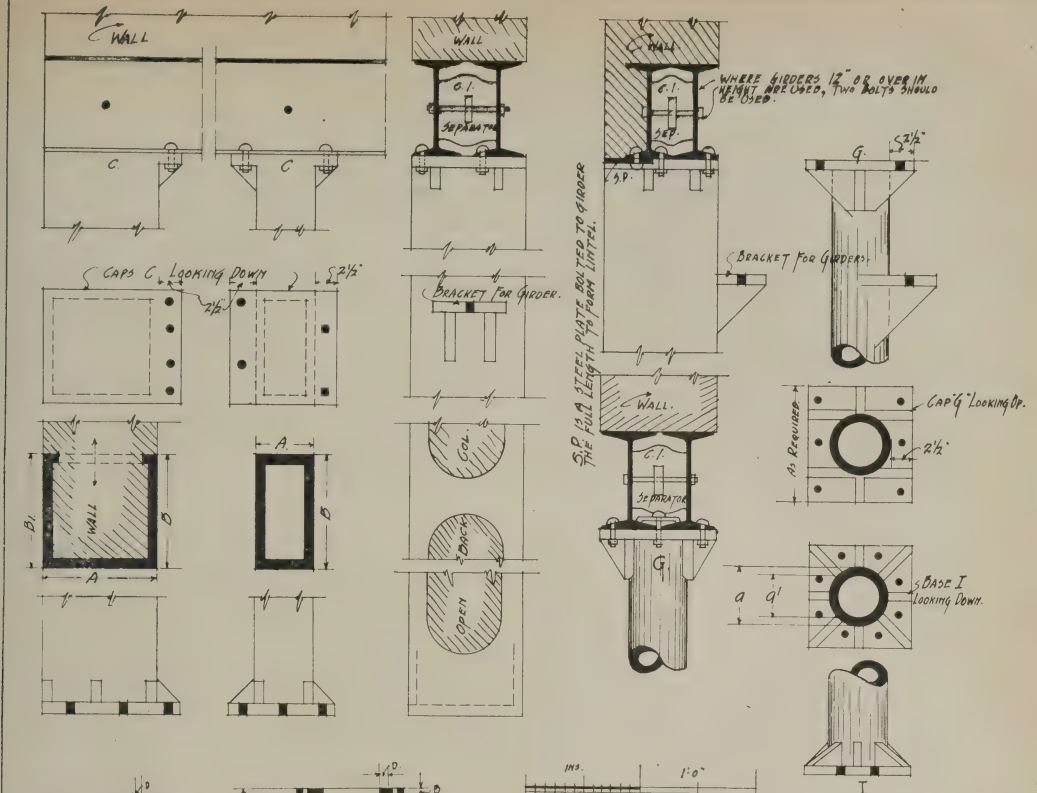
Manufacturers are now interesting themselves quite extensively in the advertising of those who handle their products. For instance many manufacturers of lumber, cement, roofing, wall-board, paints, tile, and interior fittings of various kinds furnish to their dealers electrotyped ads all ready for insertion in the local dealer's newspaper. Of course the manufacturer's product is mentioned and the dealer given as agent. As yet I know of no cases where such advertisements have been furnished to contractors but it would seem that here was an opportunity for the manufacturer to advertise his product to good advantage. The ads so furnished might state in substance that Jones & Co., or whatever the contractor's name might be, have insured the comfort of patrons moving into houses built by them, by installing Blank heaters or a Square Deal Boiler.

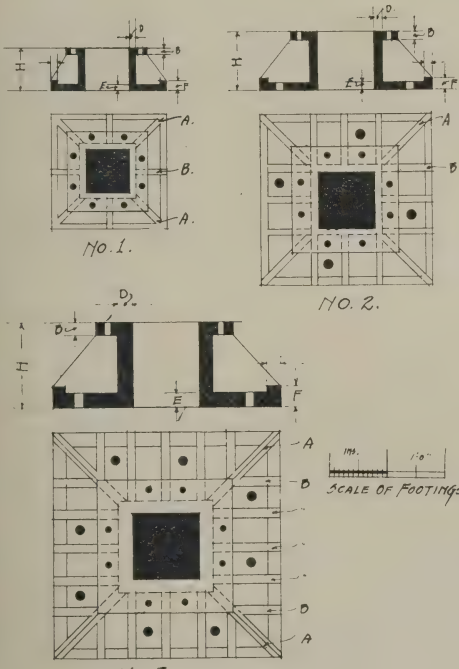
Or some such announcement as this might be made: "Finished throughout with Dash Paint Products." The ad might then go on to state that a certain house or houses built by Jones & Co., were built to look well and last long as the best possible evidence of which, Dash's paints had been used—assurance of paint satisfaction and economy. This idea of manufacturers supplying contractors with newspaper electros as they long have supplied dealers, is new but practical and it may not be many years before the practice is quite common.

By J. G. ROBINSON, Architect.



DETAIL OF METHOD OF COLUMN CONNECTIONS
FOR EITHER ROUND OR SQUARE COLUMNS.
AT THE DIFFERENT FLOOR LEVELS, WHEN COLUMNS RUN
THROUGH FROM FLOOR TO FLOOR.





No. of Base	Size of Col.	Size of Bottom.	Details & Safe Loads For C.I. Col. Footings Based on 3,000 Lbs. C.I. in Tension. H.	A.	B	D	E	F.	Safe Load in Tons.
1	6		9"	⅞"	⅞"	1¼"	1½"	2"	86
1	7		10"	⅞"	⅞"	1¼"	1½"	2"	96
1	8	24"×24"	11"	1¼"	1¼"	1⅜"	1¾"	2¼"	102
1	9		11"	1½"	1½"	1½"	1¾"	2¼"	122
2	7		12"	1"	1"	1¼"	1½"	2"	125
2	8		12"	1¼"	1"	1¼"	1½"	2"	142
2	9	30"×30"	13"	1¾"	1"	1½"	1¾"	2¼"	165
2	10		13"	2¼"	1¼"	1½"	2"	2½"	186
2	8		15"	1¼"	1"	1¼"	1½"	2"	170
2	9		15"	1¾"	1"	1½"	1⅞"	2⅛"	202
2	10	36"×36"	16"	2⅜"	1¼"	1¾"	1¾"	2¼"	230
2	11		16"	3"	1¾"	2"	2"	2½"	265
3	10		15"	1¼"	1"	1½"	1¾"	2¼"	195
3	11		15"	1⅞"	1⅛"	2"	2"	2½"	238
3	12	42"×42"	16"	2⅜"	1⅛"	2¼"	2¼"	2¾"	263
3	13		16"	3¼"	2"	2½"	2½"	3"	289
3	11		18"	1¼"	1"	1⅜"	1¾"	2¼"	251
3	12		18"	1⅞"	1¼"	2¼"	2¼"	2¾"	311
3	13	48"×48"	18"	2½"	1½"	2½"	2¾"	3¼"	362
3	14		18"	3¼"	2"	3"	2¾"	3¼"	376

DETAILS OF CAST IRON COLUMNS AND FOOTINGS.

NOTE: ALL LUGS, BRACKETS AND ALL MEMBERS OF A COLUMN SHOULD NEVER BE LESS IN THICKNESS THAN THE BODY OF SAME. ALL DETAILS CAN BE CHANGED TO MEET ANY PARTICULAR CASE.

TO COMPUTE THE METAL AREA OF A COLUMN: A SQUARE, OPEN BACK, AREA = A+B+B, X THICKNESS OF METAL FOR A FULL COLUMN, AREA = A+B X 2 X THICKNESS OF METAL. A ROUND COL. AREA = THE AREA OF 'a' LESS THE AREA OF 'a'.

Modern Plastering—Its Methods and Materials

By DAVID MACKAY.

IN THIS article we shall not concern ourselves with any extended history of plastering nor enumerate the best types of its art. But there is one fallacy that should be contradicted as forcibly as possible; the idea held by many builders that plastering is an insignificant part of the construction of any building and merits neither care in workmanship nor attention to the quality of material. In my opinion, the plastering plays an important part, making or marring the general character of the building. Nothing adds so much to the general good features of any structure when properly done. No other part is more observed or adds more to the general comfort as regards cheerfulness, sanitation and resistance to fire than plastering. No building can be beautiful or sanitary unless properly plastered.

The operation of plastering comprises, first of all, the preparation of the ground work which consists usually of wooden lath, wire lath, perforated steel sheets, hollow brick or concrete construction. As I have already considered metal and wire lath, we will take up the subject of wooden lath. This subject needs no elboration as lath is more or less standardized but care should be taken that it is free from knots, bark or other defects and is of uniform dimensions. In putting on lath, it is necessary that they should have a nail to each bearing and on the ends—two nails if a good job is desired. They should also be broken at every eight lath in order to avoid cracks in plastering. For ordinary lime mortar, the laths should be spaced ⅜ in. apart, and for patent or hard plaster not less than ¼ in. If placed closer, the mortar will not press through the spaces and its hold will be feeble owing to the absence of a key or clinch which sustains the remaining coats of mortar. Care should be taken to see that all joists or furring, especially in ceilings, are straight as that tends for an even distribution of the weight.

Much has been said and written on the preparation of plaster mortar, and many eminent authorities have flatly contradicted each other, theoretical deductions alone influencing their arguments. Common sense is a good guide in this matter as anything I know. To the measure of materials, either through ignorance or carelessness, can be laid the blame for many inferior jobs of plastering. The usual method of preparing lime for plaster mortar is to make a ring of sand, tumble in a barrel of lime, after a little stirring add hair to the steaming mass. The sand is added and the whole mixed together and piled for use. The hair by this method deteriorates as fast as the lime improves and time for cooling is made necessary. This method of preparation usually proves disastrous to the quality of the mortar, for the hair, an important part of the mortar, is almost destroyed, being burnt by intense heat which is generated. This crude method is also responsible for the blisters which appear in the plastering, in that the lime is not properly slaked. A waste of lime also takes place in that it is not thoroughly distributed through the sand, thus making for an added expense and an inferior material.

The best and most economical way of making mortar is to first slake the lime in a slakening box and then run through a sieve into a ring of sand. The advantages of such a method are easily seen. It guarantees the avoiding cracks and blisters. By the thorough distribution of the lime amongst the sand the finished plaster is harder. Since the hair is not burned and its binding properties destroyed by stacking in the hot caustic mixture, which is the first result of slaking, the final product possesses greater tenacity.

Lime for plastering should be in large hard pieces and contain little dust. When wet with water, it should slake readily into a smooth, fine paste or putty. A most important part of the mortar is the sand which should be free from loam or clay. Pit sand is generally considered the best as it is angular in its grain. River sand is too dead and usually too fine. Sea sand is deficient in sharpness and contains alkaline salts which attract moisture and is therefore unfit for plastering. The hair should be long, free from dirt, grease and salt. Hair from salted hides makes the walls damp. It should be well beaten and carefuly mixed through the lime to obtain the best results. Of late years, Manila fibre has been used a

great deal and is a first-class substitute for hair.

I take it for granted that the propositions for making scratch coat and brown mortar is largely one of experience and usage; for though many of the scientific formulas are correct in theory, yet they are impossible in practice as conditions in a building are not conducive to scientific exactness. A short formula for the scratch coat is one barrel of lime, two and one-half barrels of clean, sharp sand and two pails of wet hair. For browning, one barrel of lime, four and one-half barrels of sand and about three-quarters of a pail of hair is about the right proportion.

In slaking lime for putty, care should be taken to neither chill with too much water at the beginning nor burn by not adding enough, both being equally detrimental to the material. Putty lime when properly made should be smooth and loses in texture. Sufficient time should be given it to become thoroughly cool before using. The quality of workmanship depends greatly on the quality of the putty lime.

In scratch-coating a close watch should be kept on the plasterers to see that sufficient pressure is used to force the mortar through the openings between the laths in order that a good key or clinch may be obtained. Some plasterers have a habit of putting the mortar lengthways on the lath instead of across, the result being that a good key is not obtained.

The scratching should be thorough for it affords the key for the second coat. The latter should not be applied until the first coat is dry.

Brown coat or browning is the name given to the second coat in three-coat work, and is usually about half an inch in thickness. If it goes much over that there is something wrong in the framing, taking for granted that it is a wood lath. In concrete, terra cotta and wire construction, it often runs a little over an inch but anything over an inch means poor or careless construction. All browning should be straight and true with no unevenness or irregularity of surface. Hand floating with water is to be emphasized for the firmness and tenacity of the work is considerably increased.

It is essential in the finishing that supervision is given to see that enough plaster of paris is embodied in the putty in order that a smooth hard finish may be achieved. As to how much should be used, the question must be left to the plasterers judgment for no hard and fast rule is applicable to different conditions and materials.

As to retarding the setting of the mortar I would emphasize the fact that the use of tartaric acid is a decided detriment to good work, making for sloppy finishing, inferior in quality and porous in texture. In many cases, especially in cornicing, its careless use is dangerous for the material becomes soft and punky. The best retarder because it also benefits the material, is glue size, made out of melted glue or gelatine. It serves the same purpose and makes the mortar hard and tenacious.

Store Buildings in the Residence Districts

By JOHN CAREY.

AMONG the problems that the architect and the builder have to solve, a prominent place must be assigned to the store and apartment building specially adapted to meet the requirements of a good residential neighborhood. As buildings of the character tend, for obvious reasons, to multiply, the subject is one of growing importance.

A prime consideration with a structure of this kind is that it does not essentially alter the character of the neighborhood. The style must be domestic rather than commercial, and yet it must in a way strike and announce its purpose. A garish store, all plate glass front, would depreciate adjacent property, and, hence, would be very apt to be regarded as an eyesore and a nuisance, rather than as a convenience to be locally supported.

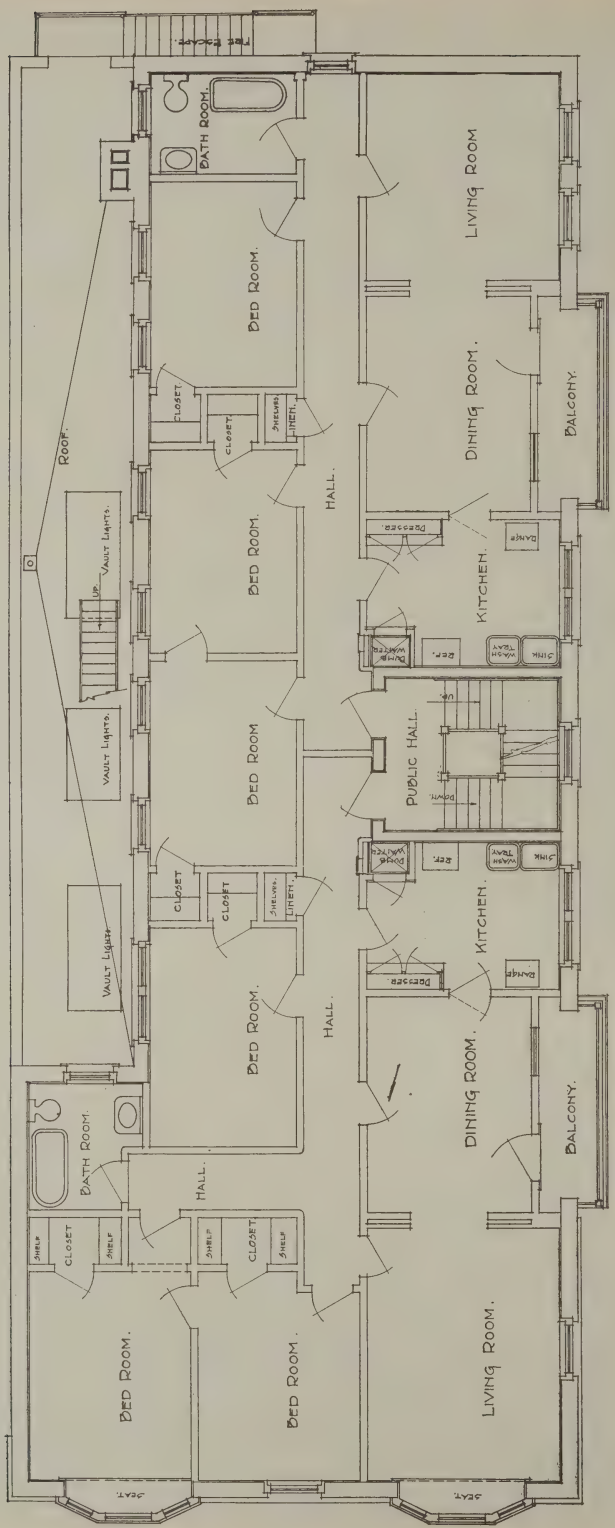
How to solve the problem, above briefly outlined, is finely shown by the accompanying illustrations, which represent a superior modern grocery store and apartment building recently erected for Mr. Storr, at Scranton, Pennsylvania, from the plans of Krieg &

Store and Apartments, Scranton, Pa.

Krieg & Osterhout, Architects.

Interior of Store at Scranton, Pa.

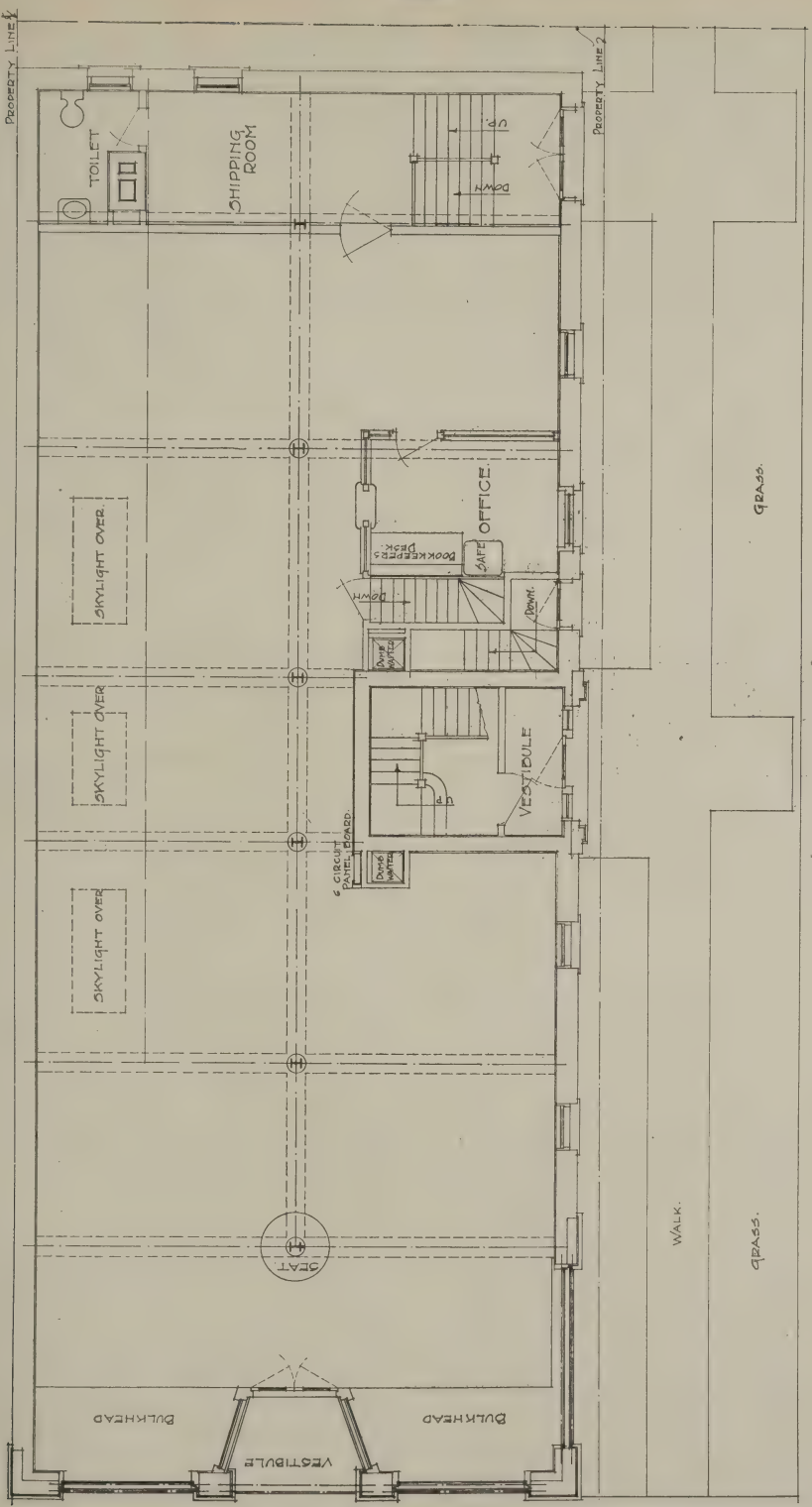
Kreig & Osterhout, Architects.



PLAN OF SECOND FLOOR.

Store and Apartment House at Scranton, Pa.

Krieg & Osterhout, Architects.



PLAN OF FIRST FLOOR.

Store and Apartment House at Scranton, Pa.

Krieg & Osterhout, Architects.

Osterhout, architects. That the neighbors approve of the design, and regard it as a desirable local improvement, is indicated from the fact that all the apartments, four in number, were let to good tenants long before the premises were ready for occupation.

The store expresses itself externally in an unassuming, refined, and substantial way. The floor space is ample, and provides for a large volume of trade, as may be inferred from the interior view that accompanies this sketch. The entrance to the store is in the center of what may here be called the main front. There are two deep store windows, one on either side of entrance, and these are reinforced by another show window, of lesser depth on the return. Two small windows, placed well above the sight line, assist the forwarded lighting over main store front, and in connection with the apartments overhead, are two tiers of bay windows.

The return elevation is given, as far as possible, a strictly residential aspect. Note the entrance to the apartments, and the manner in which it is accentuated; note also the small door immediately to the left, which affords direct access to the basement. In this connection it may be remarked that the door at the extreme end of the return is conneced with both the store's shipping room and the basement attached to it. Separation between store and apartments is thus made effective throughout.

Consulting the perspective view of exterior, we observe how the bold window heads spring from cut stone shoulders or skewbacks of extra size; the keystones are of the same material, and of corresponding dimensions. The balance of window heads is of gauged brickwork. The voussoir-like effect thus simply obtained is distinctly architectural, and displays the head of the practical designer. In order to relieve the monotony of the flat surfaces, and the better to harmonize and incidentally contrast the brickwork both the rustic stone work of the store front and return, the joints of the former are raked out and neatly finished off hollow.

The store is entirely flooded with daylight, throughout its entire length. This is largely due to the three skylights arranged longitudinally over the counters in the rear. These lights further serve the purpose of ventilation, and so aid in keeping everything sweet and wholesome. The L extension in the rear is well thought out, and serves a variety of useful ends. It brings store, office and shipping room into ready communication, and is doubtless a great expediter of business. Here is a space, retired and screened, where all can meet without encroaching upon the more display part of the store. The advantages of this L arrangement will be better understood by consulting the first floor plan and the perspective view of the stores interior together.

The plan of second floor gives the layout of two six-room apartment flats; and the same plan is followed overhead, the only difference being some minor details in connection with the stairway. The planning is straightforward and effective. Every inch of space is made available, and there are no unnecessary turns and angles. All the rooms are well lighted. The closets are ample, and each apartment is provided with its own linen press.

The kitchen is conveniently close to entrance. Dumb waiter facilitates service, and saves heavy travel up and down the public stairway. Dining room and sitting room are connected by a sliding door, a vista-like view being thus obtained. Note the balcony with which each dining room is provided; and the exterior effect as well as the interior accommodation resulting from same. The bays in front are fitted up with pleasant lounge seats, which are structural fixtures. The public hall, in which the general staircase is placed, is of right proportions. The flights are short, the landings ample, and the steps easy going, the interior finish is of hardwood.

All the apartments are equally attractive and meritorious. Some will select according to aspect, others according to floor; some will be attracted by the bays and their lounges; others by the reposeful bedrooms in the rear apartments. The choice here is happily between excellencies, and not between disadvantages, as too often chances. Thus, in the present instances, everyone should be satisfied, and happy indeed is the landlord who can say that for his tenants.

Standard Specifications for Tin Roofing

THE following specifications for tin roofing have been adopted by the National Association of Sheet Metal Contractors. These specifications were compiled after a great deal of correspondence with roofing firms from all sections of the country. The joint committee on tin plate, some months ago, had 15,000 copies of these specifications printed and sent to every architect in the United States. The National Association will be very glad to furnish printed copies for architects' use to roofing firms desiring them.

TIN ROOFING WORK.

All tin used on this building shall be . . . brand. No substitute for this brand will be allowed. Use IC thickness for the roof proper, decks, etc., and IX thickness for valleys, gutters and spouts, as required by design. One coat of red lead, iron oxide, metallic brown or Venetian red paint, with pure linseed oil, shall be applied to the under side of the tin before laying.

For flat-seam roofing, edges of sheets to be turned one-half inch; all seams to be locked together and well soaked with solder. Sheets to be fastened to the sheathing-boards by cleats spaced eight inches apart, cleats locked into the seams and fastened to the roof with two one-inch barbed wire nails; no nails to be driven through the sheets.

For standing-seam roofing, sheets to be put together in long lengths in the shop, cross seams to be locked together and well soaked with solder; sheets to be made up the narrow way in the rolls and fastened to the sheathing-boards by cleats spaced one foot apart.

Valleys and gutters to be formed with flat seams well soldered, sheets to be laid the narrow way.

Flashings to be let into the joints of the brick or stone work, and cemented. If counterflashings are used, the lower edge of the counter-part shall be kept at least three inches above the roof.

Solder to be of the best grade, bearing the manufacturer's name, and guaranteed one-half tin and one-half lead—new metals. Use rosin only as a flux.

Caution: No unnecessary walking over the tin roof or using same for storage of material shall be allowed. In walking on the tin, care must be taken not to damage the paint nor break the coating of the tin. Rubber-soled shoes or overshoes should be worn by the men on the roof.

Painting tin work: All painting of the tin work to be done by the roofer, using red lead, iron oxide, metallic brown or Venetian red paint, with pure linseed oil—no patent dryer or turpentine to be used.

All paints to be applied with a hand brush and well rubbed on. Tin to be painted immediately after laying. A second coat shall be applied in a similar manner, two weeks later.

No deviation from these specifications shall be made unless authority is given in writing by the architect. Only a first-class roof will be accepted.

Tools and Equipment for Concrete work

By JOHN UPTON.

THE tools needed in concrete work will depend somewhat on the nature of the work to be done and also on the number of men at work.

A mixing box or preferably a platform will surely be needed if the concrete is to be mixed by hand. This should be large rather than deep. I have mixed concrete in a wagon box, but do not like to.

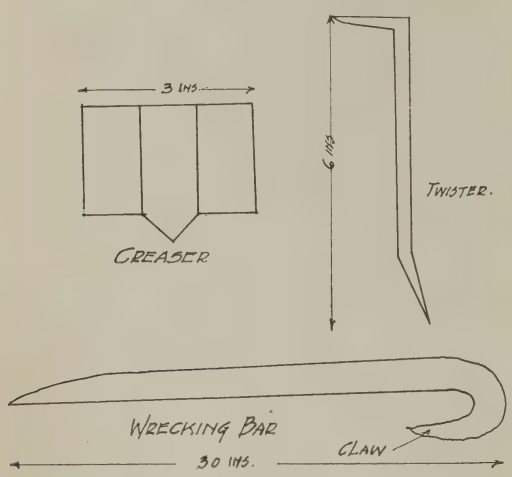
For a gang of five or six men or less, a platform some ten feet square or ten by twelve feet should be provided. To make such a platform in one part would not allow of its being easily moved, so it will be well to make it in two section, say 5x12. The lumber should be planed and matched and should be fastened together with cleats on the under side and not over two feet apart. The sides need not be high. A 2x3 or a 2x4 will do nicely.

With such a platform there will be plenty of room to work without piling the material

up into heaps. The low sides will allow wheel-barrows to be run on and off. The common railroad barrows are all right for stone and dry material but for the wet concrete regular iron tray barrows are much better and they can be purchased for a reasonable price.

Another point where a small outlay will save money is in providing good solid runs of plank both to and from the mixing board.

For measures you can make bottomless boxes to hold sand or gravel equal to two or four sacks of cement or you can use a gal-



vanized iron corn basket holding one bushel. The common iron pails are handy for sand and for water. You will frequently have need of one or more barrels for holding water.

Square shovels are needed for mixing. They may have long or short handles. I like the regular long handled shovel tho a concrete shovel has a short handle and has no lips turned up on the sides.

Hoes may be used for mixing the mortar for the top coat and a rake will prove handy.

In placing the concrete a tamper will often be needed. This can be made by boring a hole in a block of wood and inserting a handle, or one can be made of concrete, or an iron one can be purchased. A spade or fork will be wanted for working the concrete down next to the forms and sometimes a narrow one should be made from a board four inches wide.

For doing all classes of work one needs three screens, one-half inch mesh for floors and walks, one-fourth inch mesh for facing material, one-eighth inch mesh for plastering and pointing. The first two should be made from a piece of screen two feet wide and five feet long. The other one can be smaller unless it is to be used much.

You should have a plastering trowel, also a brick trowel and a pointing trowel. Besides these you will want a sidewalk edger, a center groover and a driveway groover. For some work you will want a roller for making indentions in walks and floors.

Among the home-made tools are a wooden trowel or float and a board for making grooves or creases in floors, walks and driveways. This can be made of three pieces of board four to six feet long. Two of them should be two inches wide, the others two and one-half. The wide one should be beveled on both sides so as to make a knife edge in the center. The others should be nailed onto the sides of this so that the upper edges are even.

If you are putting up and taking down forms you will need other tools. You will need a saw, a rip saw, a square, level, hammer, axe, sledge, ten foot pole, measuring tape, wire pliers, brace and bits and compass saw. If metal is used for forms you need tinner's shears or snips.

Wire will be needed for the forms and nails will also be needed. A very handy little tool is a twister for tightening wires. Another is a wrecking bar for removing forms. You may want a brush for wetting the walls and a wire brush for cleaning forms. A paintbrush if the forms are to be given a coat of oil. If wires are left in the walls they must be cut off and for this cutting nippers are used.

Of course you will not need all of these tools at once, nor will you need them all for any one class of work but if you do all classes and keep at it, you will have need for all of these in time and perhaps still more.

Dumb Waiters

By J. I. WAKELEE, President Sedgwick Machine Works.

(Continued from August.)

WHEN a builder is called upon to install a Dumb Waiter or Hand Power Elevator, or to give advice in relation to such an installation, he must approach the matter in a very different manner depending upon whether the enclosure and the conditions governing the installation are in place, fixed, or whether he is called upon to plan for the installation or the dumb waiter or elevator and the enclosure as well.

If the enclosure is already built then he should study the existing conditions so as to select the type of outfit which is best adapted to such conditions as well as the requirements of each customer, with a view to taking advantage of whatever conditions will aid in making the dumb waiter satisfactory and either modify the dumb waiter or elevator installation to suit, if those conditions render a standard type of outfit unavailable, or modify such plans if conditions will permit.

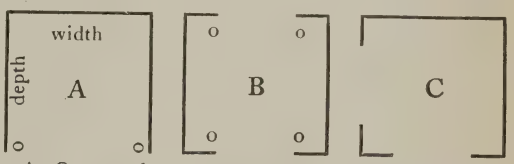
If on the other hand he is planning for the installation of an outfit, including the enclosure, then he must aim to build his enclosure and arrange its location in such a manner that the dumb waiter may be of standard type and may be accessible and conveniently operated.

It is always better for a dumb waiter or hand power elevator to be "single face," by which is meant that all the door openings in the enclosure shall be located in the same side. This permits the car to be enclosed on three sides and allows for guide runs at two opposite sides of the well.

Where it is not possible to have all the door openings in one side, then the door openings should be, if possible, arranged in opposite sides of the well, which construction is called "double face," and still permits the guide runs to be placed at the two opposite sides of the well at right and left of the door openings.

If course if conditions are such that door openings must be located in adjacent sides of the well, or even in three sides, the dumb waiter or hand power elevator outfit can be arranged to meet these conditions, but this necessitates a special form of construction and more or less complication in the arrangement of the outfit which is only advisable when it is positively unavoidable.

In an ordinary dumb waiter the door openings should be four feet high, starting 2 feet 6 inches above the floor level. This is largely irrespective of the size of the dumb



A—Open at front on all floors; the best arrangement where it can be used. B—Requires a Double Face Fixture if operated from both sides. C—Open at Front and R or L, say which. This arrangement is to be avoided, if possible.

waiter car and its purpose is that the operator may have convenient access both to the dumb waiter car itself and to the operating ropes, as it is much easier to apply the necessary power to the operating ropes when the operator can reach up and above his head and pull down on the hand ropes with a long free sweep, than is the case where the door openings are insufficient in height and are so located that the operator must stoop over and can only get a short pull on the hand rope. The width of dumb waiter doors should be approximately the width of the car to be installed and at least one of the openings must be left sufficiently large to admit the dumb waiter car into the well.

It is possible to build a dumb waiter car so that it may be put together after being placed in the well, but as there is little or no chance under these conditions to work on the outside of the car the assembling of the car and screwing or bolting it together must be done from the inside of the car, which necessitates a very much heavier construction of car than is necessary where the car is put together before being placed in the well.

A car built to be assembled inside the well is both heavier and of a more expensive con-

struction than one put together outside and the additional weight and expense does not necessarily result in either a stronger or better car.

The guide-runs which guide the car and counterweight should always be secured in place with wood screws and should be installed plumb and straight. Any mechanic will acquiesce in this statement, but at the same time observation shows that many times these guide runs are not put up straight and plumb and as a consequence the car and counterweight bind at certain places and in other places have too much play.

The most convenient lining of the dumb waiter well, from the point of view of the man who is erecting the dumb waiter, is wood. As to the wood inclosure, or the wood lining of the dumb waiter inclosure, the guide runs may be secured by means of wood screws.

Dumb waiter inclosures which are lathed and plastered inside, on wood studs, should have horizontal cats or bridging in the two sides of the inclosures, which bridging should be located on thirty inch centers, and to which the guide runs may be secured by means of wood screws passing through the runs and through the lath and plaster into this bridging.

If such an inclosure be already constructed and plastered without such bridging having been provided, it usually becomes necessary to cleat on the face of the plaster, either perpendicularly behind the guide runs, if the cleats can be properly secured, or else horizontally from front to rear at each side of the well, such horizontal cleating being nailed securely through the lath and plaster into the perpendicular studs.

In fireproof wells constructed of hollow tile and other materials without the use of wood studs, cleating may be nailed up if the material will hold the nails, and if not it may be necessary to bolt such cleating through the walls. The guide runs to be secured to the cleating by means of wood screws. Guide runs should always be secured with wood screws because no matter if put up plumb and straight there is always a possibility of warping, twisting, or settling somewhere which may throw things out of plumb and the guide runs having been secured by screws may be removed and the runs re-aligned, if this becomes desirable.

The size of the dumb waiter should be adapted to the customer's requirements. Do not furnish an outfit unnecessarily and unreasonably large, as it not only costs more in the first place, but requires more power to operate than do smaller and lighter outfits. On the other hand do not put in an outfit too small to give the customer sufficient room for the goods he wishes to handle.

The following stock sizes are catalogued and usually carried in stock for immediate shipment by the leading manufacturers of Hand Power Elevators and Dumb Waiters: Size No. 1 has a car 20″ wide by 16″ deep and requires a net space of 23″x19″ in the clear and free of all obstructions; if cleating be used this would add 2″ to the width of the space required and make same 25″x 19″. Size No. 2 has a car 24″ wide by 20″ deep and requires a space, exclusive of cleating, 27″x23″. Size No. 3 has a car 28″ wide by 24″ deep, exclusive of cleating, and requires a space of 31″x27″. Size No. 4 has a car 34″ wide by 30″ deep and requires a space, exclusive of cleating, 37″x33″.

The size of dumb waiter best adapted to the average private house is the No. 2 with car 24″x20″. Where double face outfits are required the space required has to be increased one inch in depth, for instance, a No. 2 double face dumb waiter outfit requires a net space of 27″x24″ to accommodate a car 24″x20″.

All catalogue sizes are carried in stock so that orders for catalogue sizes can be shipped within twenty-four hours. These catalogue sizes as above have been decided upon because after building thousands of outfits the sizes most generally used have been selected as standard. Special sizes are promptly made where conditions are such as to render the use of a special size advisable. The selection of the particular type of dumb waiter to be used in any job depends of course upon the requirements.

The average dumb waiter has been designed for use in private houses and flats and is therefore suitable for any similar work. Where dumb waiters are to be used for loads averaging considerably greater than in private house work, Geared Dumb Waiters should be installed, as the same

amount of power applied to a Geared Dumb Waiter will lift considerably heavier loads than it would in the private house type. Geared Dumb Waiter Outfits are built in the same standard sizes as the private house dumb waiters.

As to whether automatic brake dumb waiters should be used, depends upon whether you desire to install the best dumb waiter possible, or whether you are called upon to install merely "a dumb waiter" and naturally desire to furnish as good an article as you can at the price at your disposal.

The market is full of automatic lock dumb waiters, because customers demand them, and it is also full of cheap automatic lock dumb waiters which are not reliable nor durable because they have been designed and manufactured chiefly to meet the requirement of cheapness.

Experience demonstrates that unless a thoroughly first-class Automatic Brake machine be installed, it is better to purchase a machine which is not automatic as a good strong durable dumb waiter machine, not automatic, can be purchased for about the same price as an inferior automatic lock machine and its durability is so much greater than the inferior automatic lock machine as to make it more satisfactory to the customer. Before placing an order for a dumb waiter first study the manufacturer's catalogue and decide in your own mind just what will best meet your requirements.

If you are in doubt as to what will give the best results, then consult the manufacturer and explain clearly to him just what you wish to accomplish and the conditions under which the outfit is to be installed, and he will furnish you blue-prints, specifications, estimates, and make recommendations and suggestions which his experience as a specialist in this particular line, and his experience under similar conditions in other cases, has demonstrated to be advisable.

Methods of Estimating on Contract Work

By A. P. STONE.

MY method is this: Get a double-entry journal and make a list of the number of doors to hang, whether one pair of hinges or three hinges. Put the number and what you can hang them for, the number and description in the blank space, and the price to lay at so much per square; the number of squares of sheathing at so much per square. Itemize evtrything that goes into the job in this way.

Now we want to get at the actual cost of these items at a certain price paid for

EST #1 PERSONS NAME HERE.

ACTUAL COST.			EST. COST.		TIME 50¢ PER HR. RATE PER HR.				TOTAL
$4.50 PR " 4.50	15	SIDE DOOR CASING @ 60¢ PER SIDE	$9	-		9			9 HR.
4.50	4	WD. FRAMES @ 1.25 PER FRAME.	$5	-	1	2½	5½		9 "
50									

in the right-hand column. The number of sides of door casings to put on; the number of window frames to set in the building; the number of openings to frame in the outside walls; the number of sides of casings to put on; the number of squares of building paper wages. This we will find by setting a man to casing these doors and keep his time on casing the number of sides. Charge the time against the door casing on the same line in the journal, or have a time slip for each man and let him make a record on the slip of it—

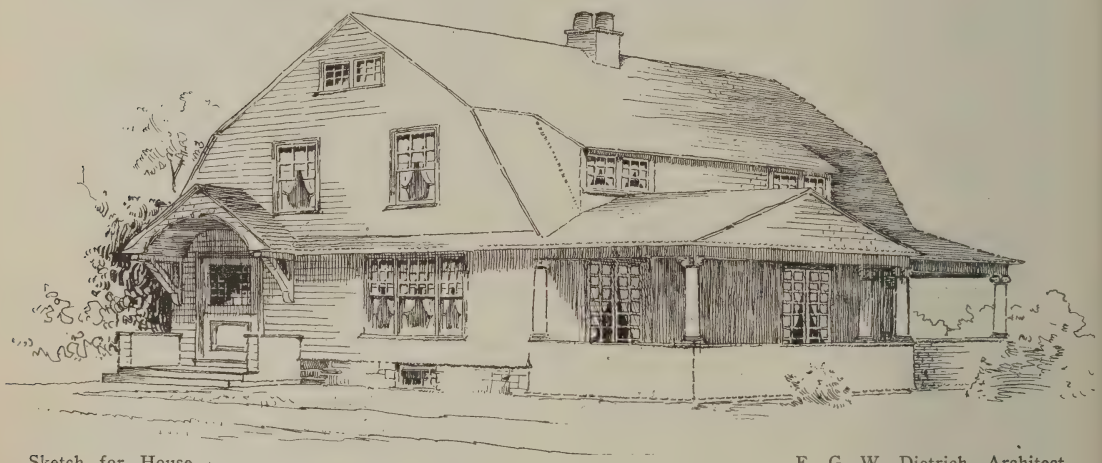
the different items or kinds of work during the day, and turn them in after working hours, or at the end of the day. Then the time and the slips can be charged up against the different items in the book.

The actual cost is found out by figuring the time by the hour at the price paid the men and placed at the left hand column on the same line with the item, which will be the actual cost of this certain kind of work at a certain price of wages paid.

I have been doing this for a number of years. While I was looking after work for the contractors, I always kept a record in this way for reference, and I know at the end of each day whether I have lost or gained and it is a great comfort. On some kinds of work, I would run behind, but the next time I figure I know just what that kind cost on the last job and I correct it.

Keep track of your work in this way and you will not need to lose any sleep.

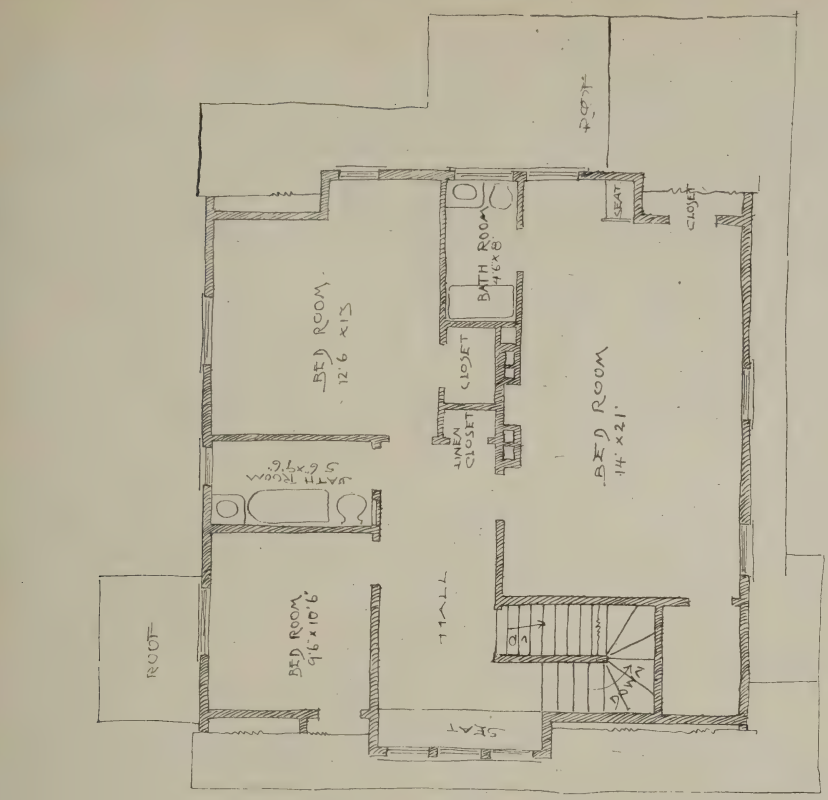
Sketches for a Suburban Home

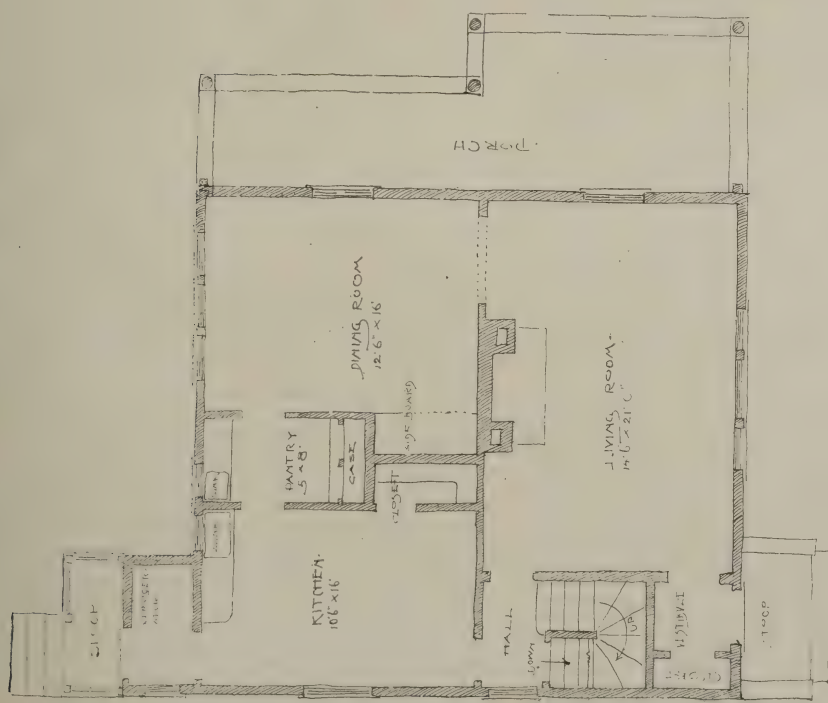


Sketch for House. E. G. W. Dietrich, Architect.

Every architect at times submits a variety of plans to the prospective home builder. These need not be complete working plans, but more on the order of the two perspectives and floor plans shown herewith. These two perspectives represent different treatment for the same plans, and show how the roof treatment affects the appearance.

Alternate Sketch. E. G. W. Dietrich, Architect.





Floor Plans for House at Passaic, N. J.

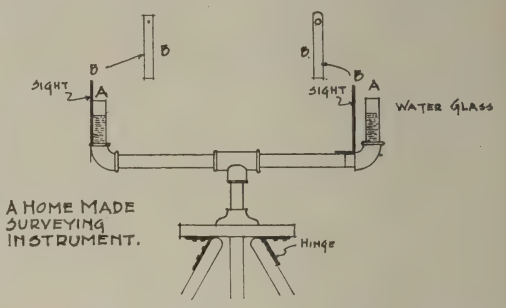
E. G. W. Dietrich, Architect.

A Home Made Surveying Instrument

By W. A. LANE.

SEVERAL years ago, while prospecting in the Sierra Madre mountains in Northern Mexico, I happened near a Mormon settlement that was about a hundred miles from the railroad. The settlers were truly pioneer, and on every hand were evidences of home-made conveniences.

I saw a man surveying on the hillside across from me, and going over to investigate, he showed me his surveying instrument, which was a home-made affair and very simple, made about as I have it in the drawing. The body is made of ¾-in. pipe and fittings about two feet long; in the elbows on the ends were fitted two short pieces of water gauge glass, as shown at A. This body was filled with water up to the point shown in the glass on each end. He would adjust his instrument until the water would show even with the level marks filed on the glasses, then he knew his instrument was level. Fastened on each end was his



sights, BB, one-half, a fine hole, and the other a half-inch hole with a hair stretched across it. The legs of the tripod were hinged to a wood base, as shown.

Some Roof Framing

By A. A. STAFFORD.

BROTHER CHIP, did it ever bother you to solve the problem of a gambrel roof? They are a crazy thing anyway, especially for a dwelling house, they are not handsome, but stiff.

The illustration is intended to show the end view of two different buildings and octagon-hexagon roof. The dotted lines and circle over the top shows the difference between all sides. Ninety degrees separates them, the frame can be heavy timber or balloon, anything to suit. I could illustrate many different frames, from the old barn with swing beam type that had timber enough in it to build three barns, up to the present, but roof work is the idea at this time. Take Figure 14, octagon first. These rafters touch the circle in three places, and 5 in. by 12 in. on the square. Cut their joints. Both will be the same length, if gambrel is wanted at 45 degrees as shown, but if top section is shorter, as some build them, then you must figure accordingly to get length to one foot run or the whole. There are two simple ways: Take a good straight-edge board, 10 in. will do, lay off from its edge a square miter, or 45 degrees as you may term it. Measure from mark along edge of board 1 ft. at this point. Place square at 5 in., other side at 12 in. Note at A where rule cuts 45 degree line is 9 and 3-16 in. Laying two squares, as at B, gives the same result. Multiply this by one-half the width of building in feet and divide result by 12 in., like Figure 14, equalling 8 ft., 5 and 1-16 in. length. Better yet, draft 1 in. equal 1 ft. Proceed with board and 45-degree line and measure off an edge just as many inches as you have feet in half the building; for instance 14 ft., measure 14 in. Lay square to it 5 in.-12 in. and you will find rule the same as at A. To cut line at 10 and 11-16 in. = 10 ft., 8¼ in., length of rafter to 45 degrees. If the gambrel is not wanted at this angle, I would advise drafting out on paper or on a smooth board, one-half the roof. Take the edge of board as side wall, lay off the lower pitch first from a square line as plate line let the pitch lines extend plenty far. Then determine how far from the plate line you wish the gambrel. From this point mark the upper pitch to 90 degrees, or one-half the width of building in your scale. If you have used ¼ in. equal 1 ft. in the width of the building, the rafters will scale the same as well as all other lines. For instance, you wish gambrel 10 ft. above plate

line. Measure square of 10 quarter-inches, then from where it cuts pitch line measure back to edge or board where pitch starts, which gives length. Be very careful in drafting and measuring when ¼-in. scale is used, as every 1-16th equals 3 in., so it is easy to make a mistake that might cost something. You will find by carefully running down some of my figures in roof work that they

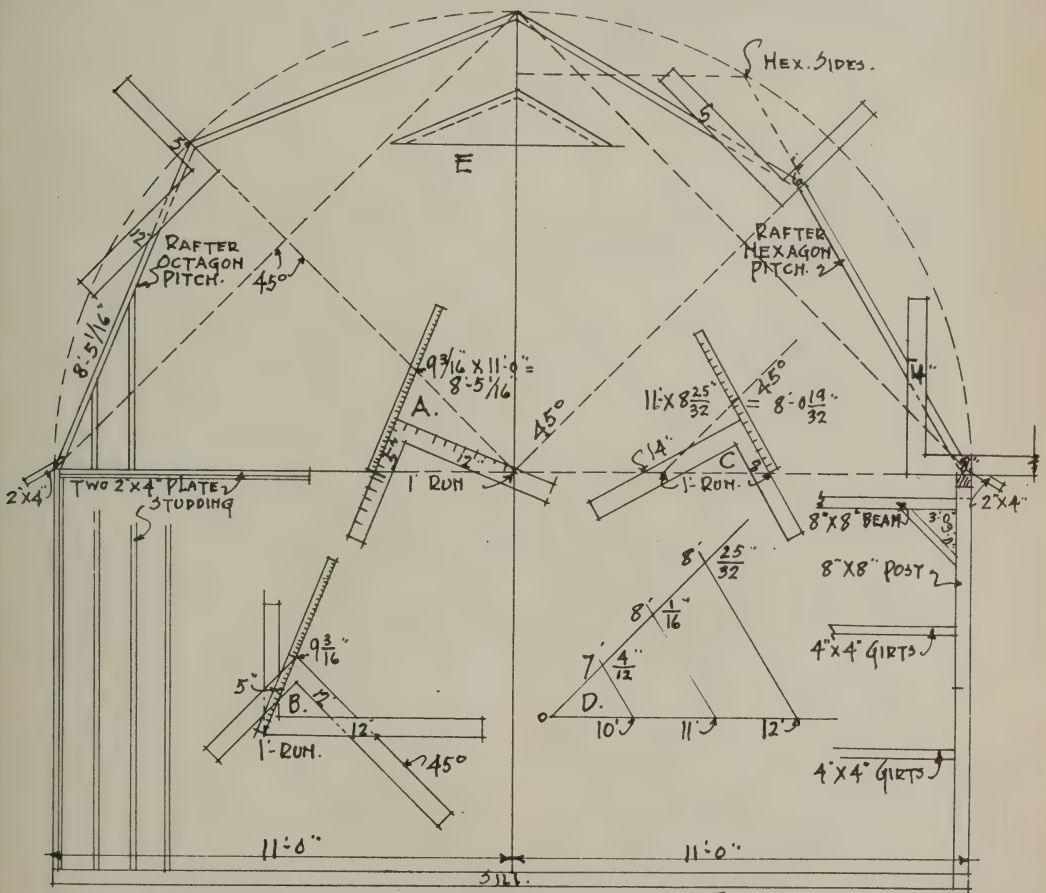
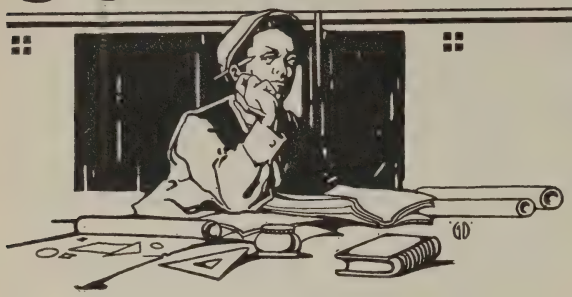


FIG. 14. FIG. 15.

are not absolutely correct, but as near as can be got without going into fractions less than 1-32nd of an inch, and that would be foolish in this class of work. Now Figure 15, hexagon side is worked the same way, only by different figures. The top end seat cuts are on 8 in. and 14 in. while the gambrel joint is very near 4 in. and 15 in. on the square, due to 45 degrees not being at hexagon joint. See dotted lines showing hexagon side at circle. Square at C, 8 in. at 1 ft. from starting point of 45 degrees and 14 in. on plate line, rule cutting 45 degrees, 8 25-32 in. to multiply. Now, the method I spoke of before: Look at D for full measurement on same pitch line as rule C and lower rafter. Suppose 10 ft. run, measure 10 in. Pitch line cuts 45 degrees at 7 4-12 in. = 7 ft. 4 in. length of rafter, the next one 11 ft. = 8 ft. — ⅜ in., 12 ft. = 8 ft. — 9⅜ in., and so on, whatever the width of your building may be. Study out these ideas and make them give you some other.

Now, to tie these rafters so as to make them practically self-supporting, put on boards like at E on both sides of all joints and well nail them, whichever way you put the rafters together on buildings or on the ground keep them in uniform shape, and have the bottom ends about six inches less across span than building is, so when they are in place there will be some strain on the timber and it will keep the roof in shape, in case no other ties can be used.

OUR READERS PAGES



[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Ed.]

Answers

BAKE OVEN.

From "Architect," Boston, Mass.:

In order to assist "Wilbur Vinear, Dallas, Texas," I send the following regarding bake ovens and their arrangements. It is rather lengthy, but a clear understanding of the subject as here presented could not well be described and illustrated in a smaller space.

A modern bread bakery needs at least two machines and two floors, and some have a third or more. The two essentials are a "flour sifter" and a "dough kneader," and the third is a "mixer' for thoroughly blending the flour and meals. The mixer, or sifter, should be above the kneader, that the flour falls from it by a shoot direct to the kneader. If the bakery be a one floor sky-lit building (which all prefer where land permits), a staging above the kneader carries the sifter, the baker working it, and the full sacks.

The illustration shows a crowded bakery (owing to the limits of our space and the size of the machines) and the cooling shelves are not shown. All the machine essentials are, however, shown. The engine or motor may be steam or gas, water or electric, and an oil engine will work well, but needs more cleaning at the burner, etc., than a gas engine does. In some districts hydraulic power is to be had, and a small turbine wheel or revolving engine can be placed nearer to the oven than any other motor and used with advantage. Electric motors need as cool and dustless a place as can be and can be slung from the roof or floor timbers. The cost of power at the meter is not the completely superior deciding point, as ease of starting, unlikeliness of getting out of order, and small oil and other stores have to be reckoned daily. At present gasolene is, on the average, the cheapest power, but hydraulic and electric motors are the easiest to start and have the fewest stores. The brake horse-power is small —seldom more than 10. Ovens are still, despite the centuries since the first was made, the greatest difficulty in the day's work. Wood (the original fuel), coal, and coke are all used to heat, from within or without, the material of the oven; steam and hot water are used also and gas and electricity a little.

Coke, either furnace or gas, anthracite coal, and steam, are the usual heaters now. In all ovens the difficulty is to make an oven that will quickly heat and keep at an even heat; and it must be recognized that the two qualities are opposite, and the happiest medium is the most that can be gained. A coke-fuel oven that takes to reach baking heat, after the first hour, less time than one hour to every 8 square feet of deck will need very regular firing for steady heat.

Inside-fired ovens are not now, despite their good points, built new in towns, because of the cost of wood fuel. Nevertheless, the inside fire could be used to help to heat the oven at the start, and the outside fire could then maintain the heat more easily and evenly.

Outside-fired ovens are the most used, and are usually stoked from the open fire for the sake of a cleaner bakehouse. The furnace is below the ground level, and a pit is excavated as an ashpit and stoke-hole. Few ovens have more than three decks, and two are usual for bread only. The fire is directly under the bottom deck, which is the hottest of course, and the smoke winds beneath, between, and above the ovens to the chimney. The fault is the uneven heat on the same deck, which cause the loaves having to be

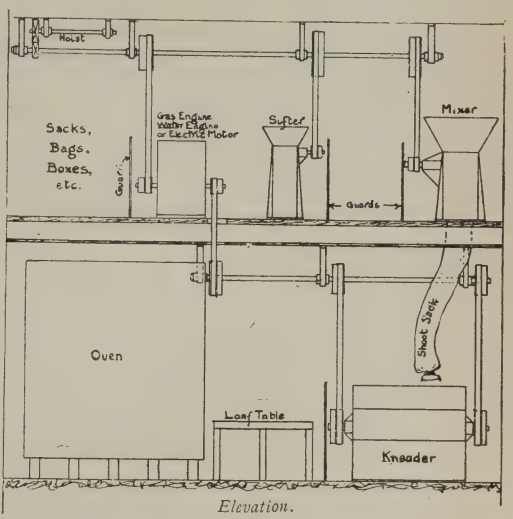
moved along and about, the soundness of the batch thus depending too much on a man's judgment and attention.

Double-draught ovens, with outside fires, give a more even heat on all decks. The fire is narrow, high and long, and central on the width of the oven; the smoke rises to the top of the shell and comes down between and at the sides of the ovens to the floor where it enters chimneys in the corners of the shell. Its faults are the more unpleasant labor in firing, difficulty to adapt to some sites, and the need now and then to take the loaves from one oven to another to finish them, and the gains are the even heat on all decks and the easier labor in the bakehouse.

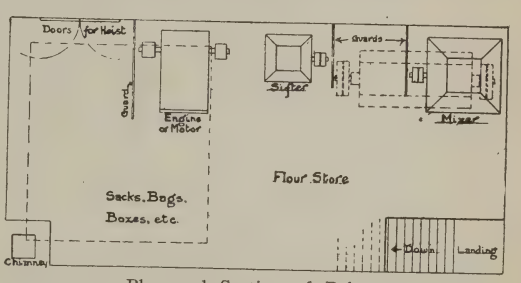
The power and speed of a fired brick oven depend on the proportion of the weight of fuel in the furnace to the weight of bricks heated, or it may be reckoned as the cubic feet capacity of the furnace to the cubic feet of brickwork heated. The chimney and half the walls, if the oven be built against a party-wall or against the outer walls of the bakery, must be counted as heated. The chance of an oven being quicker, slower, or more likely to maintain its heat, is soon found by this reckoning. The power and economy of a fired brick oven depends on the length of journey the smoke has to make ere entering the chimney. It should not be less than 15 feet.

The size of chimney and its draught affect the power, speed and economy. A chimney area of one-fourth the grate area is about the smallest that should be provided. A large area draws better than greater height, and square or round chimneys better than oblong ones. The chimney damper and air-door should be worked from the stoke-hole. Some ovens need dampers in the flues also, which are worked from the bakehouse. An air-door to the chimney is a necessity if a slow-burning hot fire and steady heat at the bottom deck are desired.

Steam ovens are either of coils of wrought iron or steel pipe supplied with steam from a special high-pressure boiler, or else sealed tubes with water in them, the tubes being connected in later pattern and patent boilers, but each a separate boiler in the older style. In both the latter types the furnace is at one end of the oven, the water ends of the tubes projecting into it, and it is stoked from outside the bakery, a lean-to roof or a shed protecting it from the weather. The water in the sealed-tube boilers soon becomes steam, and the pressure and temperature get very high, for the steam is also superheated. In the coil-tube oven with a separate boiler the pressure is more regular, but such ovens are only suited to large establishments. The quick raising of heat, and saving of fuel thereby, are the chief advantages of steam ovens. The chief drawback is the damage



Elevation.



Plan and Section of Bakery.

to the oven when a tube bursts. The pipes are cased with brickwork, and the shelves are sometimes of hot pipes also.

High pressure water ovens are older than steam, and the idea of the steam oven is adapted from them. They are an application of Perkins' system of heating water under pressure, and a higher temperature is obtained with a moderate amount of material, no risk of smoke in the oven or chamber, and less risk of explosion than with steam. One furnace can heat four ovens or more. The ovens are often long and round in shape, and are made by bending the pipes to and fro until the full shape of the oven is made. Fire-tiles are then laid on the tubes, and

bedded in plaster or mortar to sheet iron held up by iron bars or straps. The whole mass gets hot, and keeps at a steady heat as long as there is any fuel in the furnace. The drawback is the filling and pumping the water every fortnight, which practically has to be done by the engineer. The material of tubes is now steel, but the old wrought iron from the puddling furnace seemed to have better wearing qualities.

All ovens should be away from walls, floor, and ceiling if the heat is to be under control of the furnace. The ground especially has a great appetite for heat, and wastes more than goes to the air from the detached oven. The walls and floor also keep the oven hot too long when it has to be laid off for cleaning or repairs.

Gas ovens as large as 2 ft. 6 in. by 3 ft. 6 in. by 5 ft. long are now made for small pies, buns, etc., and work well. They are made with iron frames, the bed being cast iron, but the inner frame of wrought-iron bars with fire-tiles all round. The gas flames heat the tiles, and the tiles heat the articles in the oven just as in a coke-fired oven. The rule of weight-surface-journey can be applied to every kind of oven to estimate its power and capacity.

Machines for weighing, slicing, peeling, cleaning currents and sultanas, etc., are found in large bakeries, and in those that do much confectionery. When selecting, those made of good ordinary material, arranged in the simplest form to the user, should be chosen.

Lubricants for machines and shafts—Fine oils are needed for light, fast-running parts of machines, but grease is better for the heavier, slower parts and for the main shafts. The illustrations herewith show the arrangement of the machines.

CONCRETE COTTAGES.

From "J. W. P.," Bay City, Mich.:

I should think "Inquirer" of "Atlantic City" would have no difficulty in procuring designs for concrete cottages, if he takes any one or more of the many excellent papers that are now so plentiful. I submit a page of illustrations and text, which is taken from *Concrete Cottages,* a publication issued by Atlas Portland Cement Company of 30 Broad street, New York, who issue a number of pamphlets on concrete and send them free of charge to persons asking for them:

DESCRIPTION.—The foundation walls up to the level of first floor beams, the entrance porches, verandas, balustrades and posts will be of monolithic concrete cast in the usual manner in wood forms. The upper walls will be built of hollow concrete blocks with a bush-hammered face.

The roof brackets will be concrete cast in wood mold and soffit of roof protection will be plastered with cement on metal lath.

Chimneys will be built of hollow concrete blocks. Main partitions throughout will be 4-inch hollow concrete blocks.

ESTIMATE.

Excavation	$ 70.00
Concrete construction, plastering, etc.	3,950.00
Carpentry, millwork, etc	1,575.00
Electric wiring	80.00
Painting and glazing	115.00
Hardware	105.00
	$5,895.00

Cubic contents, 61,000 cubic feet.

Minor partitions will be 2x4-inch spruce lathed. Floor beams will be 2x10-inch spruce lathed. Roof beams 2x10-inch spruce.

All partitions and ceilings and inside of exterior walls will be plastered with two coats floated to a sand finish.

The exterior walls will be light gray in tone; the shingles of roof will be stained silver gray.

The door and window frames and blinds will be painted apple green.

COMMITTEE'S COMMENTS.

The floor arrangements are commodious and the exterior pleasing from its simplicity and suggestive of the use of concrete. It is to be regretted that although the specifications give the foundations to first floor level of concrete and the walls above of bush-hammered blocks, the author has not shown his textures, as it would have added to the interest of the surfaces.

MARBLE WORK.

From "Tile Setter," Chicago, Ill.:

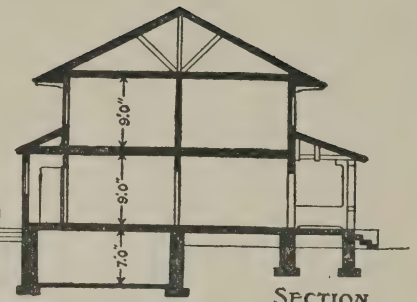
"J. W." of Victoria, B. C., should "set up" or "hang" his marble slabs on a good backing of plaster of paris, just about as tiles are hung. The fitting, of course, will have to be done with chisel, file or saw, and good work will depend on the dexterity and skill. Neat joints will be required and they must be nicely filled with properly prepared plaster of paris. If you have never done any marble work or had any experienced with this material, you had better "go slow."

COMPETITION FOR SUBURBAN HOUSES IN CONCRETE.

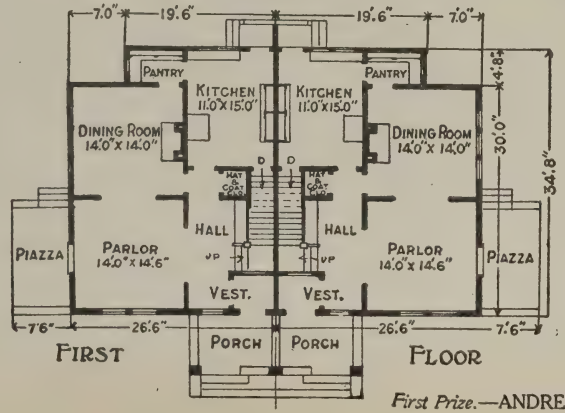
FRONT ELEVATION

SIDE ELEVATION

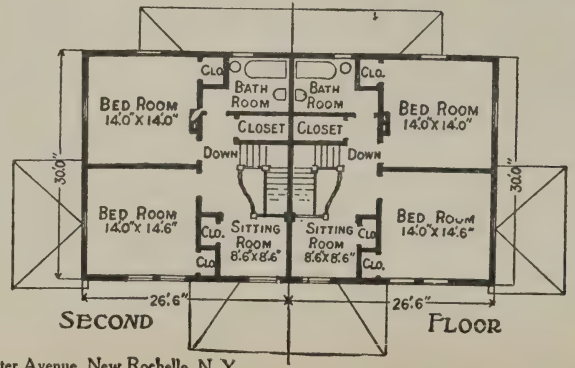
REAR ELEVATION



SECTION



FIRST FLOOR



SECOND FLOOR

First Prize.—ANDREW LINDSAY, 64 Center Avenue, New Rochelle, N. Y.

Questions

ESTIMATING PAINTING.

From W. M., Detroit, Mich.

I would like to know the simplest way to figure and estimate housepainting, more particularly the interior parts of a house.

DUTIES OF A FOREMAN.

From J. A. B., Lake Megantic, Que.

What is one required to know and to do in order to be successful as a carpenter foreman? Please point out the worst blunders of beginners.

ESTIMATING CARPENTRY.

From T. J. E.

I should like to know the simplest and best way to figure on the labor in the carpentering portion of a house, especially the interior finish.

RE-SETTING A LEVEL TUBE.

From O. A. Y., Loudonville, O.

I have a level that is untrue. Do you think that I can take the glass out and put it in again so it will be true? This is no adjustable level. What is the material into which this glass is laid? How is the mason's level and plumb bob attached used, or what use is the plumb bob on the level? Give directions on using same.

STUCCO CONSTRUCTION.

From D. D. S., Rock Springs, Wyo.

What construction do you deem best for stucco work on frame building? If outside lining is used over studding, how far out would you fur from the lining, i. e., after tar paper has been applied, and what kind of strip would you use for furring? If the lining is left off is there not a V-Metal strip applied to the studding so as to not leave too large a space or bearing surface behind the metal lath? In each case how thick should the work be for first-class job, and what construction do you think best?

The great trouble I have out here is shrinkage of lumber. Dry lumber shipped from east or west—what would be considered dry in those localities—shrinks very much after being placed in the building here. Any advice, methods or information pertaining to the above work will be very much appreciated.

ARCHITECT'S COMMISSION.

From "Architectural Draftsman," St. Paul, Minn.:

I have been doing some architectural work for a gentleman, and superintending the work, and as no special agreement as to commission, etc., was made, he objects to my charge of 5 per cent, and as I am not a regularly licensed architect, I fear he would beat me if I enter suit against him for full amount. What should I do in such a case?

STRESS ON BEARING PILES.

From "W. T. Watt," Calgary, Sask.:

Will you kindly inform me about what is considered a safe stress load for well driven piles to carry, and oblige an old carpenter?

VALLEY RAFTERS FOR TWO-PITCH ROOFS.

From W. H. I., Knoxville, Tenn.

I have never been able to find in any book where it tells how to cut the valley rafters for a roof where two different pitches are used. For instance you have a roof on one part of the house with rafters cut 11½-foot rise and, say, 28 feet wide. Then you have an L or T running in to this roof of the some width, but your rafter has only a 6-foot rise. Will the editor or someone please answer this in the columns of THE NATIONAL BUILDER as it is a difficult problem and one in which nearly every one is interested as it is a very easy matter to intersect two roofs of the same pitch, but another matter to intersect them if they are of different pitches.

HOT HOUSE AND CONSERVATORY.

From "Young Builder," Green Bay, Wis.:

I have a good sized hot house and conservatory to build for a lady and would feel obliged to any fellow reader for a few hints and pointers as to the proper manner in which to go about the work.

FOOTINGS AND WALLS.

From H. A. C., St. Louis, Mo.:

What are the proper thicknesses and relative costs of brick, concrete and stone footings for frame houses and how is the frame work anchored to same?

Book Notices

Notice.—All books noticed in these columns may be obtained from this office at Publishers' prices. All postage or express prepaid. (Money and address must accompany all orders.)

Annuary of the American Institute of Architects for 1912. Issued by the American Institute of Architects. THE OCTAGON, Washington, D. C. Pamphlet form. This should be on the desk of every architect in the United States, as it contains many things of interest to the profession not otherwise attainable.

Proceedings of the Forty-fifth Annual Convention of the American Institute of Architects along with scientific and technical papers read before the convention of the session. The convention was held in the New Willard Hotel, Washington, D. C., December 12 to 15, 1912.

Published by the Board of Directors, A. I. A., obtainable from the American Institute of Architects. "THE OCTAGON," Washington, D. C.

* * *

WHAT CAN BE DONE TO ASSIST IN THE CAMPAIGN AGAINST FLIES AND MOSQUITOES? By William Paul Gerhard, C. E., member American Society Mechanical Engineers, Doctor of Engineering, etc. Published by the author, 39 Strong place, Brooklyn, N. Y. Paper covers. Price, 25 cents.

As war is declared against the housefly and the mosquito, this little pamphlet comes in in proper season, as it lays down measures for killing the pests, and rules for their eventual extermination, something devoutly hoped for.

* * *

MOULDING CONCRETE FLOWER POTS, BOXES, JARDINIERES, ETC. By A. A. Houghton, author of "Concrete from Sand Molds," "Ornamental Concrete Without Moulds," etc., being No. 10 of "The Concrete Workers' Reference Books." Paper cover; 30 pages. Price post-paid, 50 cents.

This manual, like all those of the series prepared by A. A. Houghton, is full of excellent instructions for the guidance of those concrete workers who care to venture into the realm of ornamental and artistic cement work; indeed, with these books before him, the ordinary layman, possessing a modicum of mechanical knowledge, could well manage to make the more simple pieces of garden ornaments without the aid of expert assistance. This book is published by the Norman W. Henley Publishing Company, Nassau street, New York City.

* * *

MOULDING CONCRETE FOUNTAINS AND LAWN ORNAMENTS. By A. A. Houghton. Paper covers; 56 pages. Published by the Norman W. Healy Publishing Company, 132 Nassau street, New York. Price, 50 cents, postage paid.

This is No. 11 of the series and, like the previous No. 10, is a thoroughly practical manual and written down to the capacity of any everyday workman. These manuals are of the kind that will always be found useful, and their low price—50 cents each, post-paid—places them within the reach of every homemaker and mechanic, who should not fail of taking advantage of this opportunity of adding to their facilities for accomplishing more and better work. The following shows a list of the manuals already published, the price of each being 50 cents. They may be obtained from this office, or through the publishers:

Concrete Wall Forms.

Concrete Floors and Sidewalks.

Practical Silo Construction.

Molding Concrete Chimneys, Slate and Roof Tiles.

Molding and Curing Ornamental Concrete.

Concrete Monuments, Mausoleums and Burial Vaults.

Molding Concrete Bath Tubs, Aquariums and Natatoriums.

Artistic Concrete Bridges.

Constructing Concrete Porches.

Molding Concrete Flower Pots, Boxes, Jardinieres, Etc.

Molding Concrete Fountains and Lawn Ornaments.

Concrete for the Farm and Shop.

* * *

THE EXPERT CALCIMINER. Being a handy manual for interior decorators, containing full directions for mixing and applying all kinds of water colors for interior walls and ceilings, including cold and hot water calcimines or paints, flat wall paints, whitewash, tints, etc. Also how to prepare and apply water colors of various kinds to exterior surfaces, including casein water paints, and other water paints, with many other formulas for interior and exterior work, also a price list for calcimining and other matters. By A. Ashmun Kelly, late head instructor in painting, decorating and sign painting at the Technical Institute, Indianapolis, Ind. Printed in good sized type, on fine paper; 107 pages; stiff cover. Price post-paid, $1.00.

This useful manual deals with a subject that has never before been thoroughly exploited, and been put in such a practical form. There have been numerous articles on the art of whitewashing and color calcimining, in magazines and trade papers, but these generally only gave one phase of the art, and ended there. The author, however, shows the reader that there are many sides to the subject, each one of which is worthy of the attention and consideration of every person who is in any way interested in calcimining and kindred processes. The author, Mr. A. Ashmun Kelly, is well known to practical workers through his numerous excellent works, and as editor and publisher of The Master Painter, Malvern, Pa.

Patents

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

1,030,250. Mortar mixer. P. L. Blystone, assor. Blystone Mfg. Co., Cambridge Springs, Pa.

1,029,748. Sliding door latch. Jas. A. Giese, assor. The Adams & Westlake Co., Chicago.

1,029,803. Sash, lock and lift. Jas. A. Giese, assor. The Adams & Westlake Co., Chicago.

1,029,864. Metallic latn. M. S. Goldsmith, assor. by mesne assign. to The Cellular Metal Co., St. Bernard, Ohio.

1,030,255. Floor surfacing machine. Jno. Herr, assor. to Floor Sanding & Polishing Machine Co., Inc., Philadelphia, Pa.

1,030,094. Cement block and brick machine. Wm. I. Kennedy, Minewaukan, N. D.

1,030,192. Door fastener. E. A. Kutz, Reading, Pa.

1,029,620. Door, hatch or like closing device. G. Mazzolini, Naples, Italy.

1,029,626. Emergency exit door fastener. Robt. L. G. Palm, Verona, N. J.

1,029,822. Wall construction. Chas. E. Rafferty, Washington, D. C.

1,030,267. Concrete pile making machine. H. A. Riemann, Hannibal, Mo.

1,029,769. Fire escape. Wm. H. Smith, Gayhead, N. Y.

1,029,643. Waterproof Portland cement and making same. M. Toch, assor. ½ H. M. Toch, New York City.

1,030,841. Alarm door knob. F. Colounese & C. Boccia, New York City.

1,030,720. Attachment for water-closet seats. Chas. DeQuillfeldt, Amityville, N. Y.

1,030,660. Tool for removing floors, siding, scaffolds, etc. H. C. Hunt, Palacios, Tex.

1,030,733. Chimney cleaner. D. Johnston, Marquette, Mich.

1,030,590. Concrete roof tile. F. Latulip, assor. ½ A. F. Vadebonceur, Syracuse, N. Y.

1,030,591. Machine for making tile. F. Latulip, assor. ½ A. F. Vadebonceur, Syracuse, N. Y.

1,030,313. Door lock. Wm. D. Markley, Harrisburg, Pa.

1,030,480. Hollow concrete wall mold. F. H. Packard, Ceylon, Minn.

1,031,505. Manufacturing artificial blocks. M. P. Andrews, Petersburg, Va.

1,031,512. Tile machine. Wm. O. Beailor, Midland, Mich.

1,031,043. Concrete construction. Jno. E. Conzelman, assor. Unit Construction Company, Wilmington, Del.

1,031,044. Concrete construction. Jno. E. Conzelman, assor. Unit Construction Company, Wilmington, Del.

1,031,045. System of reinforcement for concrete slabs. Jno. E. Conzelman, assor. Unit Construction Company, Wilmington, Del.

1,031,946. Concrete construction. Jno. E. Conzelman, assor. Unit Construction Company, Wilmington, Del.

1,031,047. Concrete construction. Jno. E. Conzelman, assor. Unit Construction Company, Wilmington, Del.

1,031,048. Concrete construction. Jno. E. Conzelman, assor. Unit Construction Company, Wilmington, Del.

1,031,049. Column setting device. Jno. E. Conzelman, assor. Unit Construction Company, Wilmington, Del.

1,031,050. Concrete reservoir. Jno. E. Conzelman, assor. Unit Construction Company, Wilmington, Del.

1,031,531. Floor connection for water closets. Wm. G. Cramer, assor. C. M. Cramer, Buffalo, N. Y.

1,031,003. Waterproofing compound. A. C. Horn, New York City.

1,031,124. Window construction. Thos. H. Kane, Youngstown, Ohio, assor. Trussed Concrete Steel Company, Detroit, Mich.

1,031,190. Apparatus for making flat and corrugated cement plates. Gustav H. Liebau, Metuchen, N. J.

1,031,079. Concrete construction. A. J. Meier, assor. Unit Construction Company, St. Louis Mo.

1,031,364. Window sash. A. H. Newpher, assor. the Adams & Westlake Company, Chicago, Ill.

1,031,368. Shingle fastener. Chas. S. Perry, St. Elmo, Tenn.

87,212. Metallic reinforcing bars and members. Wm. B. Hough, Chicago, Ill.

87,213. Brick. Hydraulic Press Brick Company, St. Louis, Mo.

87,260. Certain hardware and plumbing and steam-fitting supplies. Schacht & Co., Goshen, Ind.

87,279. Certain construction material. Standard Paint Company, Boundbrook, N. J.

87,199. Building and insulating paper. W. P. Fuller & Co., San Francisco, Cal.

87,145. Canvas roofing. Wm. L. Barrell Co., New York City.

1,032,355. Floor scraper. E. W. Anderson, Manistee, Mich.

1,032,105. Building brick and facing tile therefor. Jos. E. Banks, Pittsburgh, Pa.

1,032,273. Weather strip. W. Butler, Avard, Okla.

1,031,700. Reinforcement for cement constructions. A. Fleming, Cedar Rapids, Iowa.

1,032,057. Metal window construction. Geo. H. Forsyth, assor. Forsyth Bros. Co., Chicago, Ill.

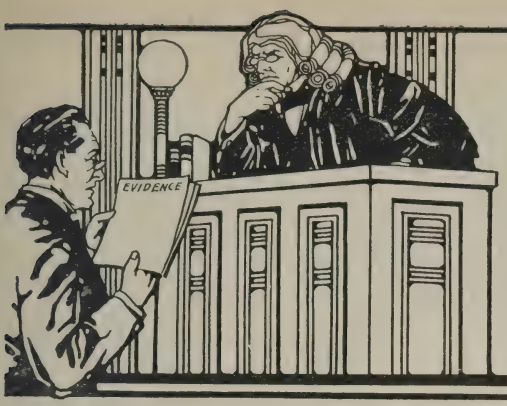
1,032,012. Roof for silos or the like. Chas. E. Martin, Mansfield, Ohio.

1,032,023. Floor surfacing machine. Jno. H. Prugh, assor. American Floor Surfacing Machine, Toledo, Ohio.

1,031,747. Rotary brick machine. Jos. Walker, assor. Chambers Bros. Co., Alexandria, Va.

TRADEMARKS.

86,973. Portland Cement. The Atlas Portland Cement Co., Northampton, Pa.



LEGAL DECISIONS

OF INTEREST TO BUILDERS

Prepared for the
NATIONAL BUILDER
by George H. Murdock

It is the duty of the architect to obtain from the owner all facts necessary to enable him to prepare proper plans and specifications for the proposed building.—Nave v. McGrane, 113 P. (Idaho) 82.

In a suit for the contract price for constructing work, counting upon performance of the contract which made the price due on delivery of the completed work, it was error to authorize recovery if the work was completed and would have been delivered had the owner not wrongfully refused to accept it unless the contractor furnished extras, and the work was destroyed by flood while doing the extra work; that issue not being raised by the pleadings.—Bastrop & Austin Bayou Rice Growers' Association v. Cochran, 138 S. W. (Tex.), 1188.

A building contract made the architect the final arbiter and required the issuance of certificates as a condition precedent to payments by the owner. The owner and the contractor made an agreement as to the amount due on the contract. The items entering into the computation were items which the architect had passed on, and the owner paid the amount due under the agreement. Held, that the owner did not waive the architect's certificate for other items before he could be compelled to pay therefor.—Fisher v. Burroughs Adding Machine Co., 132 N. W. (Mich.), 101.

Comp. Laws, Section 10,711, provides that in case title to lands improved is held by a husband and wife jointly a mechanic's lien shall attach to such lands and improvements, if the improvements be made pursuant to a contract in writing, signed by both husband and wife. Held that, where land improved belonged to husband and wife as tenants by the entirety, under an oral contract made by the husband alone, a subcontractor or materialman could acquire no lien for labor or materials furnished for such improvement.—Sheldon, Kamm & Co. v. Bremer, 132 N. W. (Mich.), 117.

Plaintiff contracted in writing to expedite delivery of structural steel and iron for defendant during a specified term, securing delivery at the times and in the manner required by defendant in its building operations, supervising the manufacturing thereof through the mills, etc., for which he was to receive forty cents per ton. Defendant was then engaged in the construction of a large building, the steel for which was furnished by the owner. At the time the contract was made two-thirds of the building had been completed, and plaintiff had been employed in expediting delivery of the steel therefor, as well as that used in the construction of another large building, which was also furnished by the owner. Held that, in view of the situation and relation of the parties, the contract applied to the steel to be used in the completion of such building, and was not limited to such steel as should be furnished by defendant itself.—Thompson-Starrett Co. v. Vandevort, 187 F. (U. S.), 805.

Mechanic's Lien Law (P. L. 1898, p. 538), Section 1, provides that every building erected within the state, including the curtilage on which it stands, shall be liable for the payment of any debt contracted and owing to any person for labor performed or materials furnished in its erection and construction, unless (Section 2) it is erected pursuant to a contract in writing, and the contract or duplicate thereof, together with the specifications accompanying it, is filed in the office of the county clerk. Defendant contracted for the construction of a building for $4,600, payable one-third when the concrete walls were finished to the roof, and the door and window frames set in the wall, one-third when the roof was completed and the framework for the inside partitions and the joists and flooring installed, and the balance within twenty days after the house was finished and accepted. Thereafter the contractor for a discount of $200 in the price obtained a modification of the contract which was not filed, by which payments were made weekly as the work progressed covered by bills for labor and materials and subcontracts. Held, that such subsequent agreement constituted a material modification of the contract, and, not having been filed, a materialman, having furnished the greater part of the materials after the contract was modified, was entitled to a lien therefor.—C. B. Coles & Son Co. v. Lothridge, 80 A. (N. J.), 484.

Building Material Price List

Revised to Date.

*Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red Cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

Dimensions,	Seattle, Wash., Corrected by F. T. Bradley. M ft. BM	Chicago, Corrected by J.H. Touchstone. M ft. BM S 2 S	Omaha, Neb., Corrected by I. P. Hicks. M ft. BM S 2 S	Southern Ontario, Corrected by F. O. Frantz. M ft. BM S 2 S
2"x4" to 8" up to 16', No. 1	$11.00	$20.00	yp $26.00	h $24.00
2"x4" up to 8" up to 16', No. 2		18.00	24.00	22.00
2"x4" to 8" 18 and 20', No. 1		21.05	27.00	26.00
2"x10" up to 16', No. 1	12.00	20.50	28.00	24.00
2"x12" up to 16', No. 1		21.50	30.00	25.00
2"x14" up to 16', No. 1	12.50	*	*	26.00
Each 2 ft. over 20 ft., add per M		1.00	1.00	2.00
Select stock as above, add per M	6.00	5.00	*	*
Exterior Finish, Etc.—		M ft. BM D 4 S	M ft. BM D 4 S	M ft. BM D 4 S
1"x3" to 1"x8", No. 1	30.00	yp $32.00	yp $45.00	wp $35.00
1"x16", No. 1	39.00	32.00	43.00	40.00
1"x12", No. 1	35.00	37.00	46.00	42.00
1¼"x3" to 1¼"x12", No. 1		45.00	48.00	45.00
1½" and 2" same as above		42.00	48.00	42.00
1" drop siding, No. 1	25.00	24.00	30.00	30.00
½" lap siding, No. 1 cedar	25.00	*	rdw 30.00	30.00
Enclosing and Fence Boards—		M ft. BM S 1 S	M ft. BM S 1 S	M ft. BM S 1 S
1"x4" to 1"x8", No. 1		yp $23.00	yp $25.00	wp $30.00
1"x8" to 1"x12", No. 1	11.00	23.00	24.00	h 24.00
1"x16", No. 1		*	24.00	24.00
1"x16", No. 2	15.00	*	22.00	22.00
Interior Finish, Flooring, Ceiling, Etc.—		M ft. BM D S	M ft. BM D 4 S	M ft. BM D 4 S
½"x1⅝", T. & G. Flooring, No. 1	30.00	yp $26.50	yp $38.00	wp $40.00
½", T. & G. Flooring, No. 2	27.00	*	34.00	wp 30.00
Ceiling per M	25.00	1.00	2.00	1.00
Partition per M	30.00	2.00	2.00	2.00
⅝"x4" Ceiling No 1	17.00	22.00	30.00	np 30.00
		100 ft. run	100 ft. run	100 ft. run
4¼" Moulded Casing	.02	yp $1.52	yp $2.00	wp $2.00
4¾" Moulded Casing	.02½	1.68	2.50	2.50
7¼" Moulded Base	.08	2.53	3.50	4.50
½"x9¼" Moulded Base		3.75	4.00	6.00
1½"x4½" Moulded Window Stool	.02½	2.12	3.00	4.00
Miscellaneous List—		Per M	Per M	Per M
Shingles, No. 1		rc $3.30	$4.00	bc rc $3.75
Shingles, No. 2		3.35	3.75	*
Shingles, fancy		W. C.	4.50	6.00
Lath, 4 ft., No. 1		yp 3.60	y 5.50	wp 5.00
Lath, 4 ft., No. 2		2.75	5.00	s 3.75
Pickets, 1"x3"x4' 6", dressed		35.00	30.00	*
Pickets, 1"x3"x4' 6", rough		*	*	*
		Piece	Piece	Piece
6"x8' Post split		Cdr $0.13	Cdr $0.25	*
8"x8' Post split		.17	.30	*
8"x8' Post whole		.66	.40	Cdr $0.30
6"x8' Post whole		.25	.35	.25
Hardware List—		Cw.	Cwt.	Cwt.
Nails, wire, common		$2.25	$3.00	$2.85
Nails, cut, common		2.10	*	3.00
Nails, wire, fine finishing		2.65	3.50	4.00
Sash Weights, cast iron		1.60	1.50	2.25
Tarred Felt Paper, best 2-ply		Roll $1.00	Roll $1.00	Roll *
Tarred Felt Paper, 3-ply			1.25	*
Red Rosin, Atlas brand			.90	$0.50
Red Rosin, durable brand			.75	.60
Black Neponset			*	2.50
Masons' Supplies—		Per M	Per M	Per M
Brick, blue, at kilns		*	*	*
Brick, blue, at kilns, No.		*	*	*
Brick, blue, at kilns, No. 2		$7.50	*	
Brick, white, delivered, face		7.00	*	*
Brick, red, delivered, backing		7.00	7.50	*
Brick, delivered, dry pressed		18.00	18.00	$17.00
Brick, vitrified, dry pressed		*	24.00	*
Lime, best gray		bbl. $1.30	bbl. $1.25	bbl. *
Lime, best white		1.40	1.25	1.80
Cement, Portland		.95	1.85	*
Plaster, calcined		2.40	1.80	bbl. $2.50
Hair, 8 lb. per bush		.25	.25	*

Note—While these figures are approximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—Ed.

New York Prices for Lumber

	SPRUCE	L. L. Y. P.	S. L. Y. P.
2x2—2 x2½—2x3 2x4—2½x4 —3x4	Average price.....$27.00	.....$32.00	.....$25.00
2x6—2x7—2x8 3x6—3x7—3x8 4x6—4x8	19 feet and under.. 32.00 Over 19 feet..... 34.00	Up to 28 feet.. 30.00	Up to 28 feet.. 27.00
2x9—2x10—2x12 3x9—3x10—3x12	19 feet and over.. 34.00 Over 19 feet..... 37.00	Up to 28 feet..	
2x9—2x10 3x9—3x10 4x9—4x10		Up to 28 feet.. 33.00	Up to 28 feet.. 29.00
2x12— 4x12 3x12— 6x12 8x12—10x12—12x12		Up to 28 feet.. 36.00	Up to 28 feet.. 31.00
14-inch		Up to 28 feet.. 40.00	Up to 28 feet.. 35.00
16-inch		Up to 28 feet.. 45.00	
"Squares" (6x6—6x8—8x8—8x10—10x10)		Up to 28 feet.. 33.00	Up to 28 feet.. 29.00

⅞-in. and 1⅛-in. white pine cornice, sound knotted	55.00
⅞-in. and 1⅛-in. cypress cornice, clear	60.00
⅞-in. and 1⅛-in. cypress cornice, select	50.00
6-in. red cedar or redwood bevel siding, clear, 8 to 16 feet	28.00
6-in. white pine, clear, 12 to 16 feet	45.00
6-in. white pine, No. 2, 12 to 16 feet	40.00

ROOFING, T. & G., SHIP-LAP OR SQUARE EDGE.

⅞x5½-in. face, N. C. pine, 10 to 16 feet	23.00
⅞x7½-in. face, N. C. pine, 10 to 16 feet	24.00
⅞x9½-in. face, N. C. pine, 10 to 16 feet	25.00
1⅛x5½-in. face, N. C. pine, 10 to 16 feet	25.00
⅞x5½ to 7½-in. spruce	27.50
⅞x5½ to 7½-in. Hemlock	26.00

FLOORING.

⅞x2¼ to 4¼-in. N. C. pine, or yellow pine, flat grain, No. 1, 10 to 16 feet	32.00
⅞x2¼ to 4¼-in. N. C. pine, or yellor pine, flat grain, No. 2, 10 to 16 feet	26.00
⅞x2¼ to 4¼-in. N. C. pine, or yellow pine, flat grain, No. 3, 10 to 16 feet	22.00
⅞x2½-in. N. C. pine, comb. grain, No. 1, 10 to 16 feet	47.00
⅞x2½-in. N. C. pine, comb. grain, No. 2, 10 to 16 feet	40.00
⅞x2½-in. yellow pine, comb. grain, "A Heart," 10 to 16 feet	62.50
⅞x2½-in. yellow pine, comb. grain, "A Sap," 10 to 16 feet	46.00

SHINGLES.

18-in. red cedar, "Perfection"	5.75
18-in. red cedar, "Eureka"	5.35
18-in. white cedar, XXXX	6.50
18-in. white cedar, clear butt	5.50
16-in. white cedar, extra	5.00
16-in. white cedar, clear butt	4.50
6x18-in. cypress, No. 1, Heart (on 6-in. basis)	11.00
6x18-in. cypress, No. 1, Sap or "A" (on 6-in. basis)	9.00
6x20-in. cypress, No. 1, Heart (on 6-in. basis)	14.00
6x20-in. silver gray cedar, No. 1 (on 6-in. basis)	18.00
6x20-in. silver gray cedar, "A" (on 6-in. basis)	15.00
6x20-in. silver gray cedar, Star (on 6-in. basis)	12.00
½-in. N. C. pine ceiling, clear, one side, 10 to 16 feet	27.00
½-in. N. C. pine ceiling, No. 2, one side, 10 to 16 feet	24.00
⅜-in. N. C. pine ceiling, clear, one side, 10 to 16 feet	24.00
⅝-in. N. C. pine ceiling, clear, one side, 10 to 16 feet	35.00
⅝-in. N. C. pine ceiling, clear, two sides, 10 to 16 feet	37.50
1⅛-in. N. C. pine ceiling, clear, one side, 10 to 16 feet	37.50
1⅛-in. N. C. pine ceiling, clear, two sides, 10 to 16 feet	40.00
⅞-in. maple flooring, 2 feet and up, clear	48.00
⅞-in. maple flooring, 2 feet and up, No. 1	43.00
⅞-in. plain oak flooring, 2 feet and up, clear	65.00
⅞-in. plain oak flooring, 2 feet and up, selects	56.00
⅞-in. quartered oak flooring, 2 feet and up, clear	105.00

	CYP.	Y. P.	W. P.
4¼-in. moulded casing	$2.75	$2.25	$3.30
4¾-in. moulded base	3.00	2.50	3.75

NOTE.—These prices are for less than car lots delivered on the job, within reasonable limits in New York, Brooklyn and the adjoining districts.

BORING MACHINE WITH THREE SPEEDS FOR HEAVY AND LIGHT WORK
BELT AND PULLEY FOR DRIVING CUT OFF SAW
TRAVELING TABLE FOR CROWNING AND SIZING JOIST

NEW PORTABLE HOUSE AND BARN FRAMING MACHINE.

It sounds almost impossible for a machine to save seventy-five per cent over the present cost of framing on large buildings, but that is precisely what the Sidney Tool Co., of Sidney, Ohio, are claiming for the new Portable House and Barn Framing Machine, and a brief description is sufficient to show their claims are more than realized.

This is a combination tool, embracing the working qualities of a cutoff saw, rip saw, borer, etc., and is equipped with a traveling table which saves handling the lumber a number of times. The machine is driven by a six-horsepower engine which forms part of the outfit. The whole thing is mounted on a wheeled truck equipped with a pulling tongue, making it easy for the outfit to be wheeled from job to job.

All kinds of house and barn framing can be done on this machine. It is equipped with the traveling cutoff saw attachment which will accommodate any size saws up to 18 inches in diameter, and is especially arranged for heavy cutting off, either straight or at an angle. The cutoff fence or gauge is adjustable for different miters and is especially convenient for squaring off joists, cutting rafter joints, or any special work of this kind.

The table is made of kiln dried oak, mounted on steel construction, and can be removed when the machine has finished on one job and it is necessary to remove it to the next job. The arbor carrying the saw is mounted on a heavy steel frame, traveling back and forth in roller bearings, operated by hand lever, and is equipped with a weight to carry the saw out of the way when not in use.

A heavy ripping attachment is part of the standard equipment. This will carry saw blades up to 18 inches in diameter, and will rip stock up to 8 inches in thickness. It is driven direct from the countershaft, and is equipped with a friction clutch with operating lever for starting and stopping.

It is arranged with a 20-foot traveling table, traveling on steel track with roller bearings, especially adapted for sizing all kinds of ripping, which is necessary to be done on a large and heavy job.

A boring machine is also provided, having three speeds, for doing heavy boring and barn framing. The traveling table carries the timbers to any desired position for boring for different mortises. The boring machine is adjustable in and out and can be swung entirely out of the way when not in use.

Another important feature is a power hoist. This has sufficient strength for hoisting heavy timber, brick, shingles or slate to the top of the building. It is arranged with the lock and trip, so same can be lowered in any position, stopped and held at any desired height or hoisted at any time, being operated by trip rope. It is very convenient for all kinds of building.

The machine comes complete with a six-horsepower gasoline engine, comprising sufficient power to operate all of the different attachments embodied. It is equipped with the best grade of belts and with friction clutches for stopping and starting all the various attachments. The cutoff saw arbor is also arranged with the extension on arbor to receive six-inch dado heads, for all kinds of gaining or framing.

The machine complete weighs about 4,500 pounds and when set up ready for operation, measures forty feet from one end of the steel rack to the other. When it is taken down and loaded the truck is only eighteen feet long.

It is almost unnecessary to add that the complete outfit is of the most durable and practical construction possible, and can be relied upon absolutely as regards perfection in operation and lasting qualities. With this machine a contractor is enabled to save so much in time and labor that he can outbid practically any competition and finish work ahead of the scheduled time.

The Sidney Tool Co. are particularly well-equipped to furnish a machine of this character, being pioneer builders of universal woodworkers—their FAMOUS machines having practically revolutionized the woodworking machinery business. Around thirteen hundred of these machines are in use throughout the country.

ALABASTINE AND ALABASCO.

The combination of Alabastine and Alabasco for interior decorating in homes is solving a long felt want for the practical man and the home owner alike.

Alabastine has for over 25 years held its place at the top notch as a quality wall tinting. The manufacturers from the start resolved that no other material should rival Alabastine for exquisite color schemes, for durability and for covering capacity.

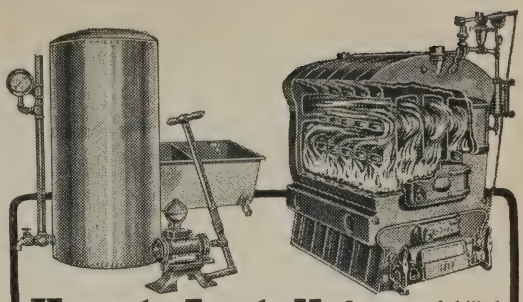
Alabasco, which is an absolutely dependable, washable interior flat wall paint, is used extensively in hotels, clubs, high class apartments and public buildings. It is made in the same wide variety of beautiful flat tints as Alabastine, and walls decorated with it can be washed with soap and water with entire satisfaction.

The combination of Alabastine and Alabasco produces an ideal decoration not only for schools, hospitals, sanitariums, etc., but for homes. Ceilings and side walls can be decorated with Alabastine. Places exposed to finger marks and others that need frequent washing can be decorated with Alabasco of the same or different tint. For example, the lower part of stairways, halls and dining rooms, bothrooms and nurseries, also kitchen and cupboards, should take Alabasco. These places can then be washed with soap and water. The additional expense of using Alabasco in this way in the home is very little and gives the utmost satisfaction. Mr. Hamilton of the Alabastine Company, 737 Granville road. Grand Rapids, Michigan, has a very convincing demonstration of the merits of this combination, which he is glad to make for those who are interested and will send samples showing the results.

INSTALLING HEATING AND PLUMBING SYSTEMS.

It may be surprising to the average home owner in the small town or on the farm to know that he can afford a modern heating plant today. The reason for this is that the cost of the actual material necessary in a modern steam or hot water heating plant is really very small. The expense that has deterred many from taking advantage of this great modern improvement has been in the cost of the material.

Now a method has been devised and perfected by M. J. Gibbons by which almost anybody can install his own heating plant. What is called the Gibbons Method of installing heating plants and plumbing systems in homes is very simple when it reaches the



How to Install Modern Heating Plant in Your Home

Save cost of skilled labor. Save on all material. Post yourself on the new method. The practical Gibbons method. My book explains how you can install hot and cold running water, bathroom outfit, **a modern heating plant,** also electric or acetylene lighting plant, at an amazingly small cost. Send for this valuable book.

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My new book gives you greater buying power than your local dealer. It is the most valuable catalog for you ever issued. Thousands of things illustrated and priced. **Hot water and steam heating plants,** gasoline engines, hydraulic rams, pipes, pumps, valves, electric lighting plants, acetylene lighting plants, all accessories. Everything guaranteed, high quality at direct, **rock bottom prices** to you. You certainly ought to have this valuable book. Just ask for Gibbons' book.

Write Today See for yourself how easy it is to make improvements about your home with the aid of my new book. The low prices of my high quality material will astound you. Home owners, contractors, builders, need my wonderful new book. Write today. Just send your name. It is post-paid free to you.

M. J. GIBBONS, Dept. 2421, Dayton, O.

BETTER MILLWORK

Plans by Geo. F. Barber & Co.
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Mr. Contractor, Are You Satisfied

that you are getting the best quality and service in Millwork and lumber that your money will buy? If not, let us prove to you that our "BETTER MILLWORK" and lumber is right in quality and manufacture, and that it will make you a **15 to 25% saving on every job.**

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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

home owner. The reason for this is that all of the technical work and all of the difficult mechanical problems are solved by Mr. Gibbons before he sends out the material.

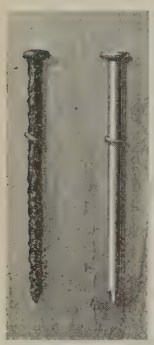
When the home owner gets the material he gets with it such complete and simple instructions that it is merely a task of assembling the materials. No expert or technical knowledge is necessary. A man who is at all handy with tools can put the materials together just as well as it could be done by a high-priced mechanic.

The health and comfort of every home today requires a modern heating plant and a modern plumbing system. It is not fair to the woman of the house to ask her to do without running water. It is not fair to the other members of the family either because running water in the house not only takes a heavy and cruel burden off the women folks, but it makes for pleasure and comfort for every member of the family.

To understand how easily and economically plumbing and heating systems may be installed in homes by the home owners themselves, it is only necessary to get a copy of the booklet explaining this new method. This book is printed by M. J. Gibbons, Dept. 2421, Dayton, Ohio, who will mail it to any address. As Mr. Gibbons sells all kinds of heating and plumbing materials, he is, of course, very anxious to have his simple methods of installing them known to every man who owns a home.

NEVERUST NAILS.

There are several ways to do anything, including the right ways and several wrong ones. Oftentimes the way in which a thing is done is not perfectly apparent until sometime after. In a matter of making nails rustproof, there are a number of ways in which they can be made to rust, but there is only one accepted method of making them rustproof. This is by galvanizing with pure zinc by the hot dipped method. Merely galvanizing is not sufficient as it is sufficient to coat the nails so thinly that the least scratch will expose the iron or steel in the nail and start the rust which only ends with the complete destruction of the nail. Some methods of galvanizing will seem to protect the nails for a time, but the test of time shows that only the best methods should be used when coating the nails.



Showing condition of a plain and a hot galvanized nail after a few years' exposure under similar conditions.

There is a way of determining whether a nail has been coated by one of the cheaper processes or by the acceptable rustproof method, that is by hot galvanizing with pure zinc. If the nail is bent double or even at right angles, the zinc on a well-coated nail will flake off if it is a thick coating as zinc in itself is of a very brittle nature. A thinly coated nail on the contrary stands this test remarkably well, and the test does not visibly affect the coating.

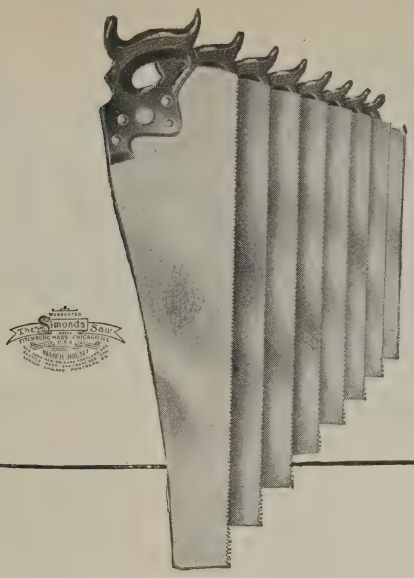
The method of coating is rather interesting.

Galvanizing Neverust Nails.

The nails are first pickled in an acid bath, which removes all of the oil, scale, dirt, etc., and serves to open the pores of the metal, and when the nails are immersed in the molten zinc, a thorough amalgamation takes place between the two metals. There are many places where it is a direct advantage to use galvanized nails. For shingling, lathing, siding, and in fact in any place where there is the slightest chance of moisture reaching the nail they should be used. The cost of galvanized nails is only slightly more than the common wire nails, while their use more than doubles their life.

Spelter Used for Galvanizing Neverust Nails.

Wilcox, Crittenden & Co., Middletown, Ct., have for years operated a galvanizing plant and are thoroughly conversant with the best methods of turning out a rustproof nail. Every nail going out under their "Neverust" brand has been subjected to careful workmanship and has received the heaviest coating possible



WHEN YOU PAY $2.50
for a
SIMONDS HAND SAW
Blue Ribbon Brand

You are getting the best saw the market affords. There is really no need to pay more than that for a saw. At the same time, the expert Carpenter who wants the best tools to enable him to best do his work should have the best saw which can be made.

Now, the Simonds Blue Ribbon Brand Hand Saw is made of Simonds Steel. That is a sufficient guarantee that the saw is evenly tempered throughout all parts of the blade and that the teeth are made of a material which will enable them to take just the right amount of set and to hold a cutting edge in nice smooth shape throughout the longest time of cutting.

It means a saving of power, because the saw cuts easy. It means a saving of time because it requires less filing, and filing always means unproductive time.

An illustration does not show all the good features of this saw. We want you to see a sample. 26″ length, $2.50. Made sway-back and straight-back, either style you prefer. Furnished in either rip or cross-cut tooth. Any desired number of points to the inch.

Your Hardware Dealer can get you one of these saws if you want to take a look at it, and you don't need to take it unless you like it when once you have seen it. It is absolutely guaranteed.

Simonds Manufacturing Company

Fitchburg, Mass.	Chicago, Ill.	Montreal, Que.
New York City	New Orleans, La.	Seattle, Wash.
Portland, Ore.	San Francisco, Cal.	London, Eng.
Vancouver, B. C.	Lockport, N. Y.	St. John, N. B.

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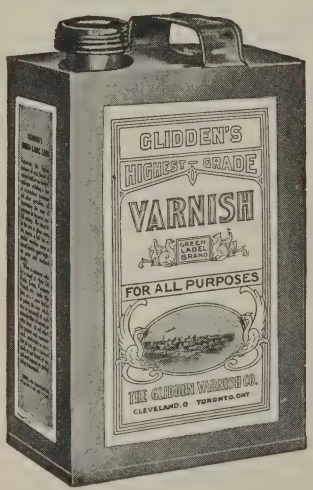
Glidden

Green Label Varnishes

"Wear Well Long After Ordinary Varnishes Are Well Worn."



M. P. Durable Floor

is the most durable floor varnish on the market. This is due not only to the superior quality of gums and oils used in its manufacture, but also to a special process of blending and manipulating and to the fact that it is thoroughly aged.

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Endurance Wood Stains

are rich in shade and pleasing in effect and will give satisfactory results.

In order that you may thoroughly appreciate them, let us send you our color card showing Glidden's Endurance Wood Stains in fourteen shades on the actual wood.

The Glidden Varnish Co.

Factories: Cleveland, Ohio — Toronto, Canada

Branches: New York Chicago London

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to give it. Their trademark, "Neverust," insures the buyer that he has obtained the best rustproof nail it is possible to buy. The complete description of their plant and their method of making their nails rustproof is interesting to every carpenter and we would suggest that they write to the Wilcox, Crittenden & Co., Middletown, Ct., for further particulars regarding this subject.

THE VAN EXPANSION BOLT.

The new expansion bolt put on the market by the Van Expansion Bolt Manufacturing Company, 415 Fort Dearborn building, Chicago, Ill., is a welcome departure from the usual means of fastening fixtures to masonry.

Expanded.

The Van Expansion Bolt can be placed in concrete, before or after the concrete is poured, and can be inserted into brick, stone, marble or tile floors, walls or ceilings, as easily as a pencil can be pushed into the hole, without the usual delay of assembling loose parts.

The Van obtains its holding power by means of a cone fitted into a composition shell. This cone and shell scheme causes expansion on wedge and screw principles. Tightening up the screw draws the cone forward and causes expansion in the shell.

Under the old methods, expansion shields depended solely upon the taper of a common wood or lag screw for expansion. Stripped threads and loosened fixtures was the result. The Van Expansion Bolt has got to hold because increasing the strain on bolt causes increased expansion of the shell and this expansion is greatest at the bottom of the hole. This assures its holding power and prevents breaking out the surface of the masonry.

This new bolt is already being widely used by general building contractors, electricians, plumbers and ornamental iron works. It is a machine-cast bolt appreciated by all classes of mechanics.

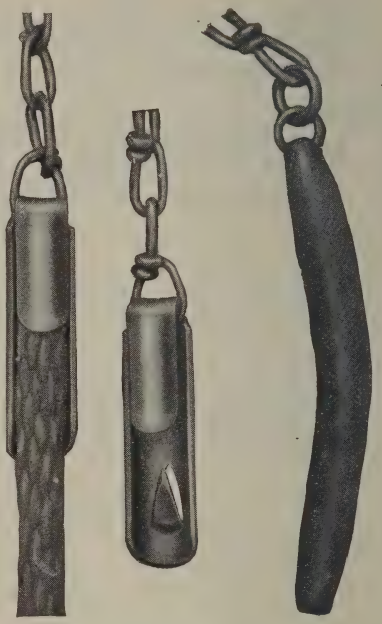
Descriptive matter of the Van Expansion Bolt will be sent to interested contractors and builders.

THE HAN-COT SASH MOUSE.

Every carpenter has experienced the need of a satisfactory device for drawing the sash cord through the pulleys and pulley boxes. Various make-shift devices have been used, but they are all more or less unequal to the task.

Messrs. Handley & Cotterman, 164 North Wabash avenue, Chicago, Ill., are placing on the market the Han-Cot Sash Mouse, which, as will be seen from the illustration, consists of a weight on one end of a chain long enough to travel through the longest pulley box. On the other end of the chain is a novel device for holding the end of the sash cord and drawing it through.

By the use of this instrument the sash cord can be cut the exact required length and rapidly attached to the sash and the weight.



The Handley & Cotterman Company will be glad to give further information regarding this useful device.

COMBINATION RIP AND CUT-OFF SAW.

We are advised by the Chicago Machinery Exchange, 1213-1224 Washington boulevard, Chicago, Ill., that they are placing on the market their model Chicago No. 5 Combination Rip and Cut-off Saw. As will be seen from the illustration, this machine is designed for the heavy work which many shops and contractors have, such as cutting lumber for forms and other building purposes.

The machine is made extremely strong to stand the hardest continuous work and wear. The base is cast in one piece and is much longer than most machines of this kind, thus giving a longer belt from countershaft to arbor pulley. On account of the advantages of using an endless belt, the countershaft bearings are adjustable for tightening the belt.

The table, like the frame, is cast in one piece, heavily ribbed and planed perfectly true. This table is adjustable up and down and is made with an opening around the saw into which a hardwood throat piece is accurately fitted, which, when taken out, gives ample room to change saws to use dado or grooving heads or similar tools. Two adjustable cut-off gauges and one tilting ripping gauge are provided, and these slide in parallel grooves, one on either side of the saw. These adjustments meet all of the requirements of the ordinary saw table and the absence of additional complicated parts permits the operator to work

Residence of A. C. Maguire, Winnetka, Ill.
Spencer & Powers, Architects.
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Exposure — Dampness — Rain, Itself, Has No Effect on

NEPONSET WATERPROOF Building Papers

Tell your customers about NEPONSET, and have the walls protected as long as the house stands. The extra cost is hardly more than the price of a ton of coal, and NEPONSET Papers will save more than this each winter.

Don't Forget the Names—NEPONSET Red and NEPONSET Black.

We also make Coted—a waterproof paper which costs only a trifle more than rosin sized. Is absolutely waterproof and very easy to apply. You can save time and money on the job.

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EAST WALPOLE, MASS.
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Best of Material and Workmanship

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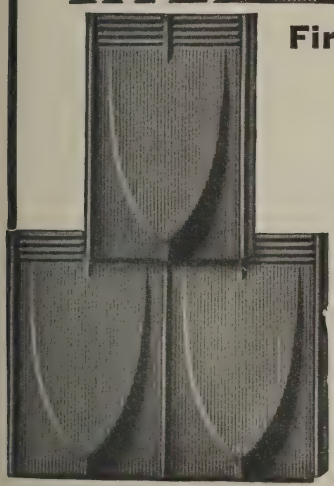
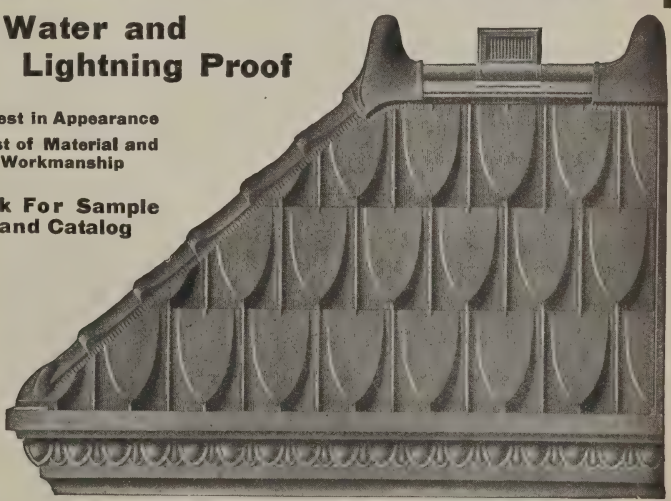


STYLE B. Showing Method of Laying.



STYLE B. Showing Ridge and Hip Finish.

MILWAUKEE CORRUGATING CO.

Kansas City, Mo. Milwaukee, Wis.

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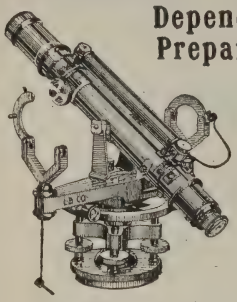
REMEMBER—Tomorrow's Success Depends Upon Today's Preparation



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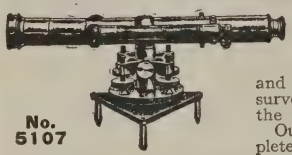

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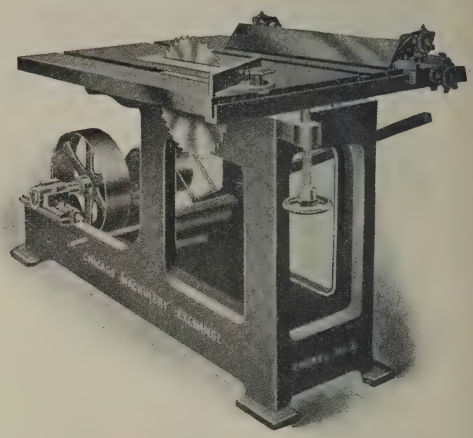
with the least chance of the machine getting out of order.

On the end of the arbor there is a novel arrangement for using the same for boring.

Among the attachments which can be used on this machine is the hollow chisel mortiser,



The Chicago No. 5 Combination Rip and Cut-Off Saw.

which makes the outfit one of the most complete universal machines for contractors' and builders' shop work now on the market.

The Chicago Machinery Exchange will be glad to send further information regarding this machine, equipment, attachments, prices, etc.

SAW POINTS.

Every carpenter knows the importance of keeping the saw teeth in first class condition. They must not only be sharpened to the correct pitch and angle, but they must be properly set so that the cutting edge of each tooth does its apportioned work.

Among those who have been foremost to solve the problems of the correct care and use of saws is Mr. Chas. Morrill, 279 Broadway, New York. Among the circulars which he has sent out to carpenters, contractors and dealers is one entitled "Saw Points," in which the various types of saws and saw teeth are described and illustrated, and instructions are given for sharpening, setting, repairing, etc.

We are advised by Mr. Morrill that he is making slight changes in the detail of the construction of his saw sets by which their usefulness is increased and their appearance improved.

It is interesting to note that each Morrill saw set is packed separately in a box and that careful directions for its use is included in every package.

While it is possible that many of our readers already have Mr. Morrill's book on saw points, those who do not have it can obtain it free.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Every Carpenter Needs These Two Squares

P. S. & W. Rafter Squares have an exclusive style of marking, making it very easy to find any information you need. With each square is packed a copy of our free book on: "How to Use the Rafter Square." Its clear, concise words and diagrams make the problems of roof-framing a simple proposition.

THE P. S. & W. "Samson" Take-Down is the most practical take-down square made. Quickly and easily locked or unlocked, strong at the heel, always perfectly true. Packed in durable, waterproof canvas case, furnished in either rafter or ordinary markings, absolutely guaranteed.

P. S. & W. Guaranteed Steel Squares in all styles and finishes, are but one of the many large lines included among our hand tools for carpenters. Look also for the P. S. & W. registered Trade-mark, "The MARK of the MAKER" on Braces, Auger Bits, Chisels, Gauges, Drawing Knives, Hatchets, Calipers, Etc., Etc.

Over 200 tools for Carpenters, Machinists, Electricians and Tinsmiths are listed in the 170-page free "Mechanics' Handy List,"—send for it.

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P. S. & W. Rafter Square is shown at the left.

P. S. & W. TRADE MARK TOOLS GUARANTEED REG. U. S. PAT. OFF.

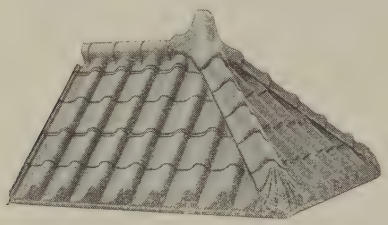
P. S. & W. Samson Take-Down is shown at the right.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

ARCHITECTURAL SHEET METAL WORK.

The careful attention of the architect, contractor, builder and owner to the many designs of architectural sheet metal work shown in the latest catalogue of the W. H. Mullins Company, 210 Franklin street, Salem, Ohio, will convince them that the completed work will bear the most careful criticism.

The designs shown in this catalogue are those for which the W. H. Mullins Company already have the patterns and dies. They are therefore able to either forward goods from stock or make them up on short notice and



at no advance over stock designs. The complete equipment of the W. H. Mullins Company plant, machines and presses, combined with their corps of sculptures and skilled mechanics, enables them to produce special designs from architect's drawings or sketches.

The catalogue shows a complete line of metal tile roofing in various patterns, cresting, finials and other exterior decorations. A large number of more or less elaborate store fronts are shown as well as cornices, mouldings, modillions and capitals.

The metal ceilings manufactured by this company are highly artistic and are adaptable to various styles to conform with the interior decorations of the building. We understand that the W. H. Mullins Company is anxious to have on their list the name of every progressive builder and contractor as their goods are used in so many different places that the catalogue should be used as a ready reference.

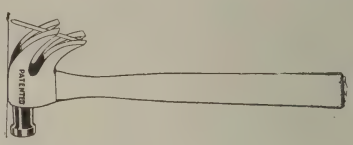
With reference to the article on "A Country Residence" at Wilton, Conn., in No. 4, Volume 54, in August edition, 1912, the tile roof on this building was delivered by the W. H. Mullins Co. of Salem, Ohio, and the asbestos for in and outside studs by Paul Mende of New Rochelle, New York.

THE DOUBLE CLAW HAMMER.

The hammer with the double claws,
Of merits it is full,
It draws attention and draws nails—
The hammer with a pull.

The one-time prejudice against new tools, machinery, methods, etc., is rapidly disappearing. Every mechanic appreciates the fact that he must keep posted to keep up with the advance in his line.

The Double Claw Hammer is one of the tools which is meeting the wants of many mechanics, as by its use it is possible to overcome many objections to the old style hammer. A clever part of the design consists in being able to hold the nail in the claw so as to set it in place for high nailing, as high as the arm can reach, thus frequently saving expensive scaffolding where a comparatively small amount of work is to be done. The method of manufacturing this hammer is de-

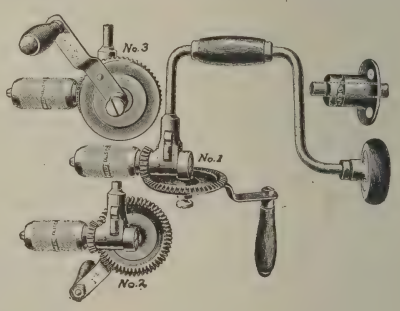


signed to make it practically indestructible, and the guarantee which the manufacturers give with it would seem to cover every possible contingency.

While the Double Claw Hammer can be obtained at every first class hardware store, the manufacturers, The Double Claw Hammer Company, 453 Broadway, Brooklyn, N. Y., will be glad to either direct the intending purchaser to a dealer where it may be obtained, or they will supply him direct.

THE 192 DRILL BRACE.

There are many places where the ordinary drill brace does not meet all the requirements. There are angles and corners to work into which cannot be reached with the full sweep. In places such as this the drill brace No. 192, made by the Millers Falls Co., 28 Warren street, New York City, is a particularly satisfactory tool to use. In this brace an auxiliary



gear is attached by a thumb screw and is adjustable to several different positions.

But it is not the adjustments alone which make this tool particularly valuable. The high quality of material used renders it extremely durable. The method of manufacture as well as the design insures that the brace will be easy running, and with little probability of wear. The brace is fitted with the Millers Falls Co. best grade ratchet and universal chuck.

This drill brace complete is an excellent substitute for the highest grade iron working drill, and it has the advantage of being instantly interchangeable to the regular brace. Further particulars regarding this tool may be obtained by writing to the Millers Falls Co.

ORR & LOCKETT HARDWARE CO
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¶ Most contractors and builders doing business in Chicago and vicinity know that they save time, trouble and money by sending us their orders for

Builders' Hardware

¶ But there are others who do not realize what an advantage it is to have the benefit of our service, forty years of experience and tremendous buying power, and this advertisement is intended for them.

¶ In the first place we carry at all times the largest and most complete line of builders' hardware in the country, so we seldom have to hold up an order because something is "out of stock." And this huge assortment (including the well known brands), gives you the greatest possible choice of kinds and prices.

¶ We very seldom fill an order with the goods of any one manufacturer exclusively, but select those pieces which are acknowledged to be the leaders in each manufacturer's line. Thus the entire order contains only the highest grade articles—not a weak link anywhere.

¶ In packing our goods for shipment we sort and label each piece from the specifications so that the workmen on the job lose no time in handling. Any contractor will appreciate the great advantage of receiving his hardware in this shape.

Send us your plans or specifications so we may show you

ORR & LOCKETT HARDWARE CO
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14-16 W. Randolph St. CHICAGO, ILL.

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Bungalow at Evansville, Ind. F. R. Ingle, Architect.

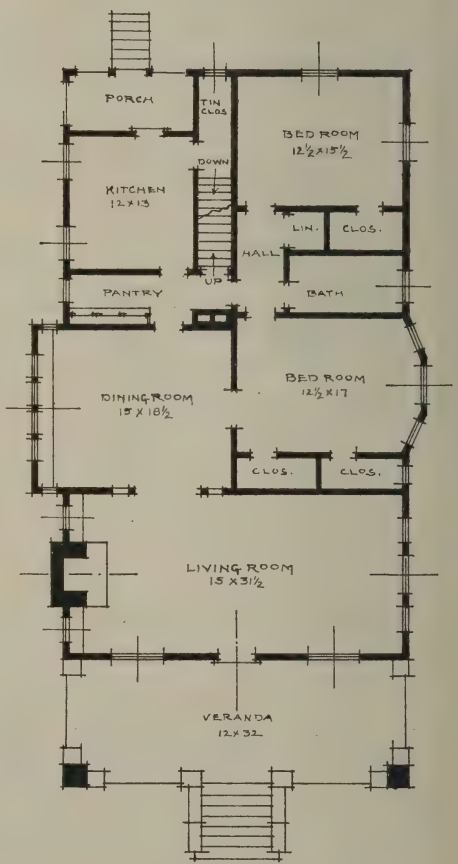
A MODERN BUNGALOW.

Through the courtesy of the Heppes Mfg. Co., 4502 Fillmore street, Chicago, Ill., we are able to show on these pages the plan and several photographic reproductions of a beautiful bungalow recently built at Evansville, Ind., from the plans of F. R. Ingle. The plan shows five rooms on the first floor conveniently arranged for modern social purposes. The bungalow was built on a corner lot and possesses the unusual feature of a garage in the basement, thus avoiding the troubles incident to having a separate building subject to freezing in the winter, etc.

A novel feature of this bungalow is that the interior walls and ceilings are covered exclusively with Utility wall board. The beautiful effects obtainable with this material are well shown in the photographs.

The use of Utility wall board allows the house to be finished in much less time as there is no delay due to the putting on of the plaster and allowing it to dry. The woodwork is not exposed to the moisture arising from the wet plaster, which is a potent cause of settlement cracks, as well as warping and twisting of the trim should the carpenter put it on before the plaster is entirely dry. Should any repairs ever be necessary or changes in the arrangement of rooms requiring cutting the walls, there is no disagreeable muss and clutter such as accompanies cutting an opening through a plastered wall. While this cutting is unusual, how often we hear people say that they would change the plans slightly if it wasn't for the dirt and dust of the plaster being tracked through the house.

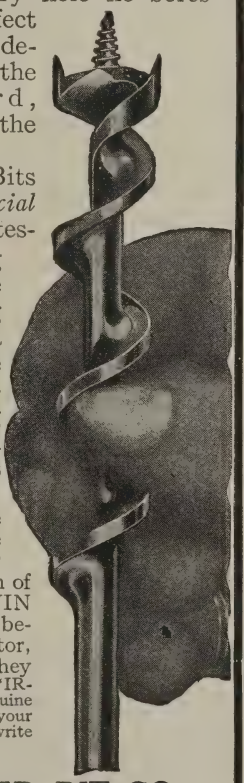
The Heppes Mfg. Co. have a neat portfolio showing various installations of Utility wall board, which we understand they will send to our readers on request.



The IRWIN Bit
Reg. U.S. Pat. Office

Here's the Auger Bit that Bores Clean as a Whistle Thro' Hardest Woods

THE modern carpenter *insists* on the IRWIN Auger Bit—because he wants every hole he bores clean and true. Perfect results are what he demands; he chooses the bit that takes hard, knotty wood just the same as *soft* pine.



IRWIN Auger Bits are made from *special* quality of tool steel, tested for temper taking qualities—for tensile strength; for boring in lignum-vitae, a wood so hard that the every-day commonplace wood-working tool turns its edge in a second and gives up the job.

IRWIN Auger Bits are forged from a solid piece of steel, lathe-turned *by hand* to one-thousandth of an inch. Every IRWIN passes through 50 hands before reaching the inspector, who decides whether they are worthy of the stamp "IRWIN"—found on *all* genuine IRWIN Auger Bits. If your dealer hasn't the IRWIN, write us.

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Largest in the World
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Insist on the Genuine Guaranteed IRWIN BIT

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on Your Building Material Bill!

NO shrewd Contractor or Builder can afford to be without our newest catalog of guaranteed Millwork and Building Material. It's the best thing of its kind ever published. Has 3 000 superb illustrations and 8,000 dollar-saving prices—Buy your material from us, we ship direct to you and there are no jobber's or middleman's profits to pay. We sell at wholesale, guarantee satisfaction and safe delivery. H. B. MUNGER, Prest.

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PLAN BOOK—No. 41 House and Barn Plans.

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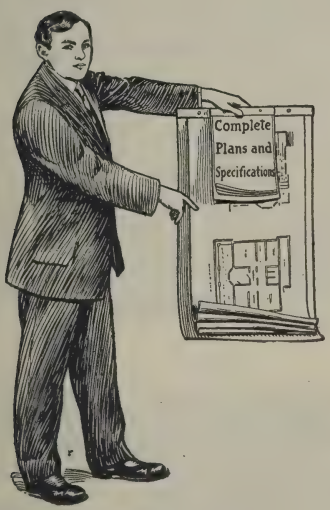

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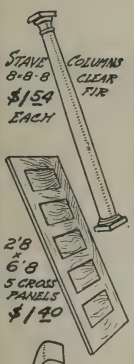
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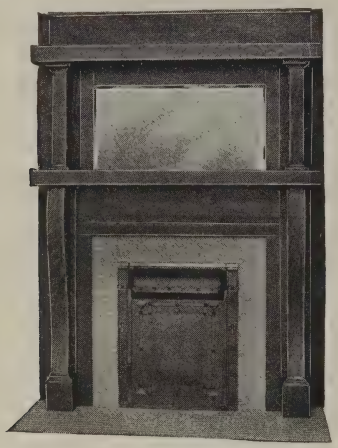
ARTISTIC MANTELS AND FIREPLACE TRIMMINGS.

Whether the house be located in the extreme northern part of the country or in the south, there are many times in the course of the year



No. 875½

when a grate fire is comfortable. For this reason we see very few houses built without some provision for a fireplace; the more elaborate houses go to extremes in their mantel decoration, often requiring elaborate special designs. For the moderate home, however, there are many excellent patterns in stock sizes available.

The Central Mantel Company, 1237 Olive street, St. Louis, Mo., have just issued a magnificent catalogue showing some of the stock patterns of their mantels, fireplaces, grills, etc. This catalogue gives directions for setting wood mantels, tile and fireplaces, as well as miscellaneous information on this class of work. The Central Mantel Company will send this complete catalogue to those who are interested in or contemplating the purchase of fireplaces or mantels. It should be in the hands of every contractor and builder, as by its use a mantel can be selected harmonizing with the style of the house and with the contemplated decorations.

PHILLIPS' SPRING HAMMER.

Masonry construction frequently requires that holes be drilled for attaching woodwork, marble and other decorations. This can, of course, be done laboriously by hand or, where electric power or air pressure is available, by expensive electric or pneumatic hammers. The average contractor, however, does not have sufficient use for these high-priced tools to warrant their purchase, nor is the job often equipped with the necessary power to operate them.

The Phillips' Spring Hammer was designed for the use of the contractor in cases like this. This hammer is operated entirely by hand and is capable of striking from eight hundred to two thousand powerful blows per minute by merely turning a crank. The blow is struck by spring power and is therefore entirely automatic, each blow being the same strength as the preceding one—a novel adjustment device providing for working in different materials such as stone, brick, concrete, etc.

The Orr & Lockett Hardware Co., 1721 W. Randolph St., Chicago, Ill., are placing this tool on the market, where it is meeting with extreme satisfaction. This is fully described in Bulletin N and the interested contractor is advised to write to them for this bulletin, prices and other information.

WOODWORKING MACHINERY.

A great many contractors and mechanics are so situated that the power woodworker is not available, but who still must have something more than hand tools. The Seneca Falls Manufacturing Company, 629 Water street, Seneca Falls, N. Y., in their catalogue No. 21-A show a great variety of hand and foot power machinery adapted to the contractor's

use. The catalogue also shows some of the moldings and other cuts which may be made on these machines.

We understand that the Seneca Falls Company is in a position to furnish many of these machines with power if required and the intending purchaser of this class of machinery should correspond with them and learn the advantage of their various machines.

STEEL POLISHED PERFECTION FLOORING

A modern hardwood floor is the product of years of effort on the part of a number of manufacturers to produce a floor which would be permanent and pleasing. The nature of wood is such that it all requires careful preparation to fit it for the exacting purposes as a finishing material, such as floors, trim, etc., and it has required much patient effort to evolve processes by which all the good qualities of the wood may be retained and still relieve it of the disadvantages which green, immature and improperly prepared material presents.

The John Schroeder Lumber Co., foot of Pleasant street, Milwaukee, Wis., have specialized on hardwood flooring. Among the woods which they make up and carry in stock

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No promises! No money needed! No red tape! You can try this all steel, shaft drive grinder with its Dimo-Grit (artificial diamond grit) wheels for **30 days absolutely free**—then if you do not want to keep it, return it at my expense. You can **put all your tools in bright, keen condition,** and you will be amazed at the ease and speed you can do it—grind all your chisels, twist drills, gum your saws, etc., for 30 days free.

Dimo-Grit, "the wheel for steel"—25 times faster than the grindstone—10 times more efficient than emery—will not draw temper—no need of cooling with water.

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The Hummer complete shop outfit embraces 14 attachments and accessories, supplying every sharpening, grinding and polishing need. Tool rests and attachments enable the apprentice boy to do difficult grinding such as twist drills, gumming saws, chisels, etc., fully as well as a high paid mechanic—saves tools—saves time—saves money—makes all work easier. Return the coupon for Free Trial offer and free Book today.

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Mechanic's shop outfit includes 14 attachments—16 others to select from. No machine ever built is like the "Hummer;" it makes tool-sharpening child's play. Shaft drive like an automobile, dust proof ball bearings—runs by foot power as easily as sewing machine—engine power can be applied. From the extra attachments such as jig saw, rip saw, lathe, drill, etc., you can select what you want. **No other machine so moderate in price saves money in so many different ways.** 5 years guarantee.

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are maple, beech, birch and oak. In order to produce the finest quality, this company dries the material twice, so as to get rid of every particle of the moisture which would effect the high quality of the finished material.

In the manufacture of the flooring, they are likewise particular. Every process is carried on by machinery designed especially for the purpose, and the product known as Steel Polished Perfection Hardwood Flooring is believed by the John Schroeder Lumber Co. to be the very best grade which can be produced. This company has recently prepared a very fine booklet on hardwood flooring, which they wish to place in the hands of everyone interested in high grade flooring. This book is sent free on request by readers of THE NATIONAL BUILDER, and it is well worth sending for whether one has present need for flooring or contemplates its use in the future.

EXCELSIOR TOOL BAGS.

The Excelsior Bag & Mfg. Co., Troy, N. Y., have recently placed a number of new designs of mason's, joiner's and carpenter's tool bags on the market. These bags are made of extra heavy canvas, coated with a special preparation made only by this company, and they possess unusual wearing qualities.

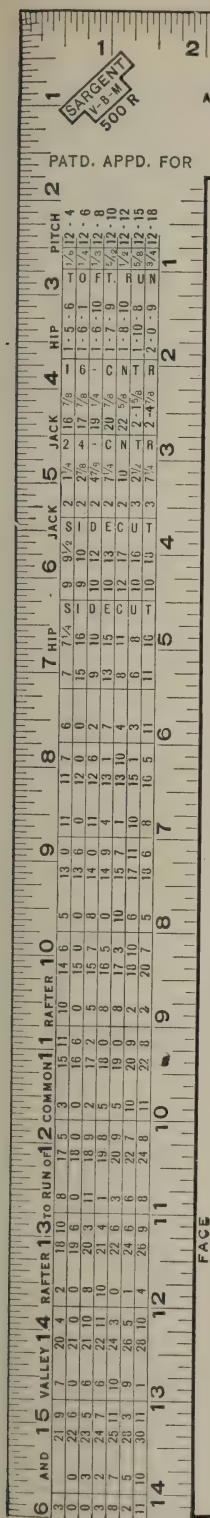
The mechanic going upon the job is often judged by his appearance. The man who carries fine tools in a dirty cement bag is frequently passed up for the neat appearing man with his tools properly protected from exposure to the weather and from damage in transit. The frequent moves necessary for anyone in the building trades renders proper carrying facilities extremely necessary.

We urge every carpenter and mechanic to investigate the merits of the Excelsior bags before the next time to move comes. It may mean a difference of several days in landing another job.

OAK FLOORING.

When one enters a home where oak flooring is used, his attention is immediately attracted to its artistic and distinctive appearance. It would seem that nature had given peculiar qualities to this wood to be used in the place where the greatest wear comes on the entire building, and which also is the largest unbroken surface.

The interior decorator as a rule prefers oak flooring because it is rich and cheerful in color in itself and blends harmoniously with any kind of furniture or color decoration. The wide-a-wake owner likes it, because its ap-



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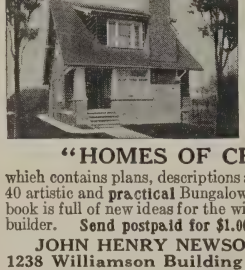

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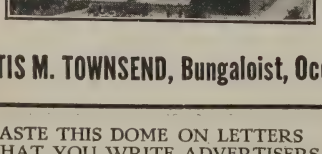

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Oak flooring is made in a wide variety of sizes and is graded so that for any particular use one can find the proper grade.

The Oak Flooring Bureau, 892 Hammond building, Detroit, Mich., has issued a complete treatise on oak flooring which they wish to place in the hands of every contractor, carpenter and builder, and in fact every one interested in the better construction which oak flooring provides. This treatise will be sent to our readers on request.

THE RED CEDAR SHINGLE.

The vast expanse of the United States holds within its borders an immense variety of trees whose lumber is more or less available for practically every building purpose. Among the most important of these trees is the Washington Red Cedar which grows in immense forests in the Northwestern states.

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Red Cedar Shingles do not require staining or painting to make them attractive. Should, however, the color scheme of the house require it, their nature permits practically any desired finish.

One of the most important considerations with Red Cedar Shingles is that the nails must be as permanent as the shingles. For this reason the ordinary shingle nails are not nearly as satisfactory as the galvanized, zinc or copper nails.

The Red Cedar Shingle Manufacturers Association, 497 Arcade Annex, Seattle, Wash., have prepared a very interesting circular on the good qualities, uses, etc., of Red Cedar Shingles. These circulars can be had on re-

MODERN LUMBER METHODS.

For many years the practice in the lumber industry has been for the lumberman to cut and make up the lumber at the mill, pass it on to the wholesaler, and so on down to the jobber and retailer before it reached the consumer. In this way, each of the above, as well as the traveling salesman and the commission men took their profits as the lumber made its way from the mill to the job.

The Hewitt-Lea-Funk Co., for years followed this same practice. They found, however, that the gap between producer and consumer was widening year by year, neither getting the benefits they should out of the business. They, therefore, organized a system by which the lumber was sold direct from the saw mill to the contractor on the job, thus benefiting the contractor and his client, the owner. In this way a better grade of material was frequently obtained than was other-

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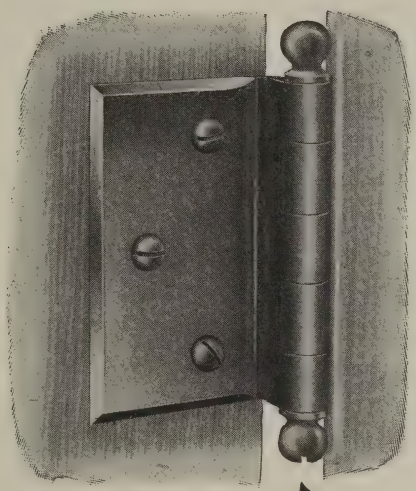

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wise possible, as the material furnished was exactly that which was ordered and the owner secured the benefit of prompt deliveries as well as the reduction in price.

The Hewitt-Lea-Funk Co., 629 1st avenue, Seattle, Wash., have unusually good facilities for transacting business by this method, as they own the forests, mills, and the railroads by which the logs are brought to the mill. Their circulars showing the variety of sizes and grades of various materials which they manufacture will be sent to interested contractors and builders.

DECORATIVE GLASS.

The use of decorative glass for the ornamentation of homes as well as the more elaborate public buildings dates from the earliest times. Few of our modern churches or monumental buildings but what contain excellent examples of the glass or mosaic worker's art. Even in our homes there are places where a bit of color subdues the intensity of the bright sunlight, producing a pleasing appearance in harmony with the other decorations and color schemes of the various rooms.

The Von Gerichten Art Glass Co., 549 S. High street, Columbus, O., are well known specialists in the line of art glass and mosaic work. Their latest catalogue shows excellent examples of work in these materials, and indicate the possibilities of this style of decoration for various purposes. This catalogue, beautifully printed in colors, will be sent free to those of our readers who have problems of this character to contend with.

FIREPROOF WINDOWS, DOORS AND SHUTTERS.

We hear a great deal of talk about fireproof buildings and fire protection and many seem to think that these are problems for the large cities only. That this is not entirely the case is shown by the fact that the large cities are well protected againts large conflagrations, while many of the smaller cities and towns have practically no protection at all and these need consideration far more than they receive.

In every small town there are a number of buildings which could be rendered practically fireproof at comparatively slight expense. As a rule these buildings, built of brick or stone, represent a considerable investment and the contents are more or less valuable. The chances are too that close to these buildings are others of the most inflammable construction. You find frame buildings used as stables, filled with hay and straw, and other buildings of a like source of danger. The ordinary brick building can be readily made proof against the entrance of fire by the use of metal windows and wire glass, and thus protect the building and contents from outside fire or serve to hold the fire in, should it originate within the building. Windows of this character are looked upon with great favor by insurance companies and the much lower rate given when such safeguards against fire are used.

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These men took time to study, took time to find the better and more modern ways of doing things, and these are what distinguish them today from the low-wage laborers.

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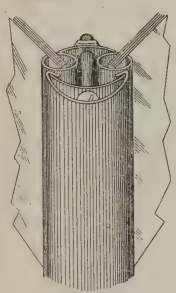
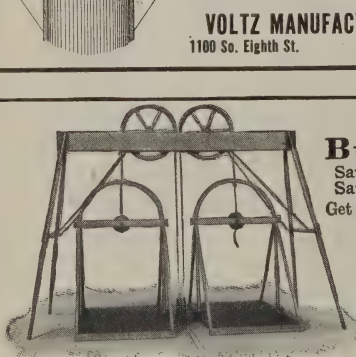

It contains all the essential features of the STANDARD UNIVERSAL SASH BAR—but is smaller in the outside contour and is lower in price
The Voltz F. W. Bar No. 14 does not show any screws from outside. It makes any and all angles without cutting or fitting and allows for expansion and contraction, etc.
Send for circular—it will show you how to put in the handsomest and safest plate glass store fronts.
VOLTZ MANUFACTURING CO.
1100 So. Eighth St. ST. JOSEPH, MO.


Wise Builders
Save Dollars by Saving Minutes
Get wise to the time and labor saving features — the simplicity, durability, easy running, quick set up and knock down and other advantages of the POLYGON
MATERIAL ELEVATOR
WATERLOO CEMENT MACHINERY CORPORATION
111 Vinton St., Waterloo, Iowa

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

signed a sheet metal frame and sash for use in place of the ordinary double hung window. The regular sizes in which these windows are made are practically the same as for the wooden frames and sash, and they can be built in the wall with equal facility. Where it is so desired, these windows can readily be inserted after the walls are built, taking either the place of old windows or filling openings cut especially for them. Catalogue A of the Willis Mfg. Co. describes a number of these windows as well as wire doors, shutters, etc. This catalogue is of interest to all those interested in keeping the fire loss down and saving the property of themselves and others.

BELLS.

As the factory whistle is the accepted method of calling the employes to work and announcing the hours of labor during the week days, so the church bell is the time-established method of summoning people to worship. That the forms of bells used by the ancients were more than mere sound producers seems questionable, as the founders of bells, during modern times at least, have exerted their energies to produce not only far-sounding but sweet-toned bells. The material entering into composition of the metal for bells renders the bell more or less expensive, while the care used in design and manufacture adds also to the cost. The American Bell & Foundry Company, Northville, Mich., have not only designed a bell on scientific lines, which insures not only the correct sound but long life, and in their composition have combined such materials as give the most pleasing tone.

For whatever purpose bells are intended, those contemplating the purchase of them should correspond with the American Bell & Foundry Company and learn what styles and sizes are best adapted to the particular purpose.

MODERN PLUMBING MATERIALS.

We are advised by the John Hardin Company, 4541-4549 Cottage Grove avenue, Chicago, Ill., that they are about to issue a large catalogue showing the latest designs in plumbing fixtures, complete outfits for bathrooms, etc. The fact that the John Hardin Company have been in business for twenty-five years at one place indicates the reliability and integrity of the concern. During that time they have placed high-grade plumbing supplies, steam and water goods into the homes of customers in every part of the United States.

We are advised by the Hardin Company that this catalogue will be out very soon and that they are already making up a list of names to which it will be sent. Those who have not already been in correspondence with the Hardin Company can have their names placed on the list so that they will receive this catalogue as soon as published, and also such future publications as are issued.

Approved—

"A product without a peer."

This word has been used in connection with—

Apollo

Best Bloom Galvanized Sheets for over twenty-five years. An incomparable record.

Write for full information and quotations on Black and Galvanized Sheets, Copper Bearing Open Hearth Terne Plate, Continuous Roofing Tin, Formed Roofing and Siding Products, Metal Lath, Etc. Every builder should have our Pocket Reference Book.

American Sheet and Tin Plate Company

General Offices: Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES

Chicago Cincinnati Denver Detroit New Orleans New York Philadelphia Pittsburgh St. Louis

Export Representatives: U. S. Steel Products Co., New York City
Pac. Coast Representatives: U. Steel Products Co., San Francisco, Los Angeles, Portland, Seattle

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Specialists and Manufacturers of

BUILT-UP VENEER PANELS

For Architectural and Interior Woodwork

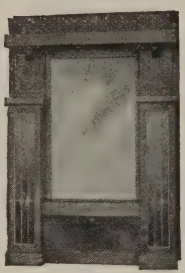
Made up to your exact specification as to size, thickness, kind of wood required.

AMERICAN VENEER COMPANY

433 Market Street :: :: KENILWORTH, N. J.

CONSOLES, COLUMNS, and GRILLES

add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.



SEND FOR CATALOG No. 17

It contains many beautiful designs of Consoles, Columns and Grilles

Northwestern Grille Works

Office and Showroom, 1824 Milwaukee Ave., CHICAGO

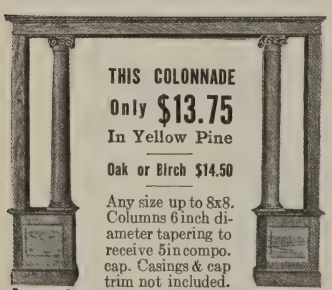
PHOENIX INSIDE SLIDING BLINDS

Comfort : Convenience : Economy

The lately patented springs and corrugated steel rods put the "Phoenix" far in lead of less improved styles.

WRITE FOR CATALOG P-T.

PHOENIX SLIDING BLIND CO., PHOENIX, N.Y.



THIS COLONNADE

Only $13.75

In Yellow Pine

Oak or Birch $14.50

Any size up to 8x8. Columns 6 inch diameter tapering to receive 5 in compo. cap. Casings & cap trim not included.

THIS is positively the best Colonnade for the price in the market today. Take advantage of this special offer. Quality, satisfaction and safe delivery guaranteed. Order today. Give exact width and height of opening. State what kind of wood.

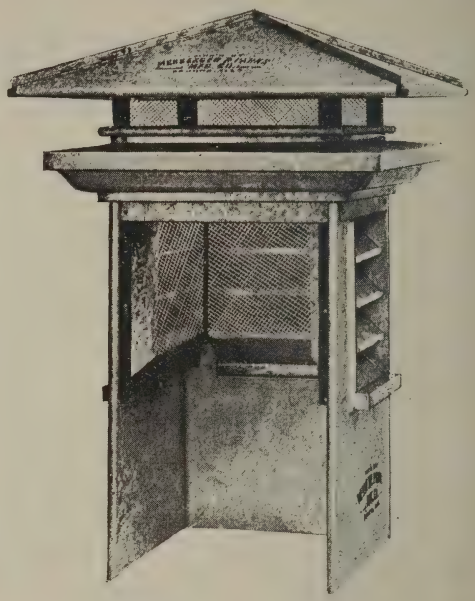
Our Catalogue No. 35 shows many new designs Write for it.

Bertelsen Adjustable Grille Co.

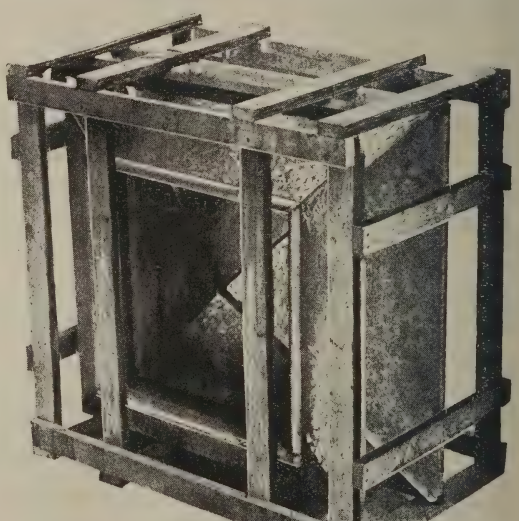
615-617 So. Clinton St., Chicago

THE AURORA CUPOLA VENTILATOR.

Stores, factories, mills and similar structures require the highest grade of ventilation. In these cuts we show a form of ventilator de-



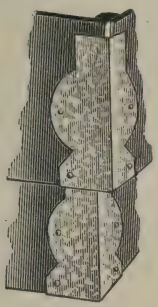
signed by the Messenger & Parks Co., Aurora, Ill., and used by them on buildings of many characters. This ventilator is built complete in such shape that the ordinary mechanic can



install it without the use of an expensive sheet metal worker or expensive tools. The catalogue of the Messenger & Parks Co., showing a complete line of metal goods for building will be sent on request.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

More Profit For You.



You can now give your customer the popular mitre-corner effect without the slow, careful work of cutting and fitting bevels.

Use Metal Building Corners

They take the place of corner boards. Save fully $2 worth of time in finishing each corner, make a stronger and neater job.

WRITE FOR FREE SAMPES TODAY.

F.D. KEES MFG. CO. BEATRICE, NEB. Box 811

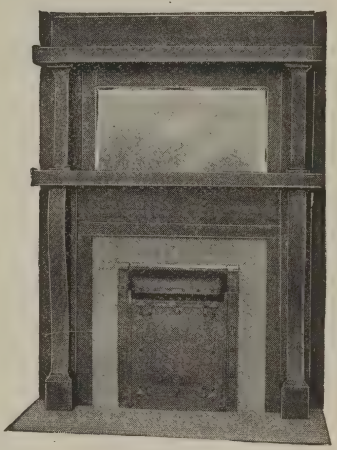
If you've never used Gossett Hinges for full length window screens, say so and we'll send you a sample pair free.

$28.60

For this Elegant, Massive Selected Oak or Birch

Mahogany Finished Mantel

Beveled Mirror, 18x36 inches



No. 875½

"FROM FACTORY TO YOU"

Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns as shown in cut. **Dealers' price not less than $40.00.**

"Reputation and Quality Count"

CENTRAL MANTELS

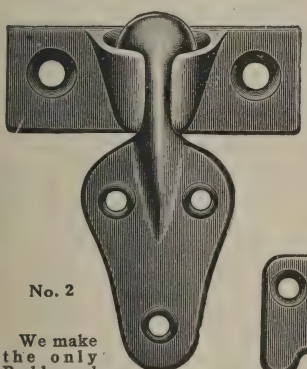
are distinctive in workmanship, finish and style. Twenty-five years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

CATALOGUE FREE. Will send our new 100-page catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

Central Mantel Company

1237 Olive Street St. Louis, Mo.

STORM SASH AND SCREEN HANGER Nos. 1 and 2



The time is drawing near at hand when carpenters and builders begin putting up storm sash and it might be well to say that the best and most convenient goods are always the cheapest in the end.

No. 2

We make the only Ball and Socket Hangers on the market. One trial will convince you that they are the best.

No. 1

Our No. 1 Fastener is made of the best steel wire. It holds the sash firmly against the blind stop and prevents rattling.

Manufactured by the

Diehl Novelty Company, SHEBOYGAN, WISCONSIN

Send for Catalogue

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

LOOK INSIDE!

SEE THOSE STAPLES.

STAY-LOCKED COLUMNS
DO STAY LOCKED

They're different—made to last and cost no more than inferior columns. Insist on having them—you'll not regret it.

Write for Catalog F—A beautiful free design book worth owning.

AMERICAN COLUMN COMPANY LTD.
BATTLE CREEK, MICH.

We manufacture everything in the line of

Consols, Colonnades Columns and Grilles

Special prices to the trade
Established 20 Years.

Chicago Grille Works
826-838 Wells St., Chicago, Ill.
Catalog Free

CABINET AND MILL WORK

Of the Highest Order Turned Out Right in Our Own Big Plant

At Prices You Cannot Equal Elsewhere —Considering Quality

Send Us Your Lists or Plans for Estimate We Will Return Them Promptly

You will like our work · Let's get together NOW

Harty Bros. & Harty Company
21st Place & Loomis St. CHICAGO

MR. CARPENTER AND BUILDER! WHY NOT MAKE some extra money?

by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **Rolling Ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary to send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

Write for Catalogue

Milbradt Manufacturing Company
1442 N. Eighth Street ST. LOUIS, MO.

FALL PAINTING.

There are a number of reasons why painting should be done in the fall. The condition of the outside surface is then at its best as it has had the summer's sun to thoroughly dry the exposed surfaces. There has been no prolonged damp spells which would permit the lodging of moisture in the corners and angles. There is also the consideration that the weather is apt to be good and the home owner as a rule is better prepared to spend the necessary money to put his house in first-class shape.

Painting must be done not only for looks, but for the preservation of the materials. The coming winter months will be severe on the exposed surfaces and it is necessary to have them in first-class condition. Therefore, the wide awake contractor will see that all of the buildings in which he is interested are properly prepared for the cold days—not only the buildings on which he is working, but those whose owners expect him to see that they are kept in repair.

When considering the quality of paint to use, the contractor will undoubtedly think of Lowe Bros. Co. and their excellent line of prepared materials. This company has done a great deal of educational work for better paints and finishes and their circulars are of interest to every contractor and builder. Besides their standard catalogues, they have issued a number of books, one of which is "Homes Attractive from Gate to Garret." This book should be in the hands of every contractor and builder and we would suggest that our readers write to the Lowe Bros. Co., 473 E. 3rd street, Dayton, O., for this book as well as for assistance regarding their particular painting problems.

THE SAW IN HISTORY.

Every user of saws wonders at times just what the development of the present day saws resulted from. The Henry Disston Company, Philadelphia, Pa., have for several months been publishing a short history of saws and their manufacture. This series of articles appears in the Disston Crucible, a magazine for the millman, but which is also of interest to every carpenter.

The Disston Company is well qualified to write and speak on such a subject as this. Their experience in saw making began when saw making in this country was in its infancy and their steady progress is largely due to the consistent work turned out by their establishment.

We believe that every contractor and builder interested in reading of the progress in this line of tools can secure the future numbers of this magazine by writing to the Disston Company.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

DOMINANT REASON No. 1

KNO-BURN Never Comes Off!

This picture shows a mass of KNO-BURN LATH removed from the old store building of Rothschild & Co., Chicago, after 8 years of service. The wrecking crew were not able to separate the lath from the plaster. You can see it still clinging to the *mesh that makes* KNO-BURN *infallible.*

This is one of the reasons why

KNO-BURN
EXPANDED METAL LATH

Dominates the field.

Other reasons will be given in subsequent advertisements—if you want them at once, write for Booklet 53 describing KNO-BURN LATH in detail.

Fireproof—Not corrugated—Non-Sagging—Galvanized after expansion—These are a few KNO-BURN features.

North Western Expanded Metal Co.
905 Old Colony Building, Chicago, Ill.
Largest Exclusive Manufacturers of Metal Lath in the World

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Northwestern Terra Cotta Company

Manufacturers of High Grade

ARCHITECTURAL TERRA COTTA

ENAMELED WORK A SPECIALTY

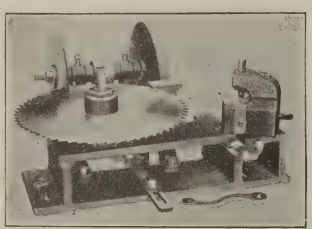
Main Office and Works, 2525 Clybourn Ave.
Branch Office, Room 1415 Railway Exchange

CHICAGO, ILLINOIS

New York Office 31 Barclay St
Pittsburg Office Royer Hotel Bldg.

Von Gerichten Art Glass Co.
Designers and Workers in
Decorative Glass
Quality not Quantity

Write or come to the Studios of the
VON GERICHTEN ART GLASS CO.
550-558 S. High St., Columbus, O., U. S. A.
Workers in Art Glass and Mosaics. Catalogue Free.



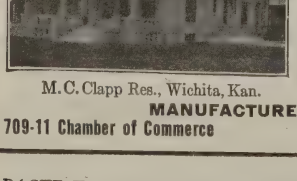
THE CONRAD
SAW TOOL

Is a big money saver for Contractors, Builders and Millmen.
An inexperienced ordinary mechanic can

Gum, Joint, Set and Sharpen Circular Saws Easily and Perfectly

¶ The Conrad 14 inch machine handles saws from 5″ to 24″ in diameter and occupies only an 18 inch square.
¶ Price so low no one can afford to send saws away for repairs.
Write for Circular N, and Special Offer.
H. G. CONRAD, 709 So. Clinton St., Chicago, Ill.

143 Cities Used **"STONEKOTE"** Rough Cast In 1911



M. C. Clapp Res., Wichita, Kan.

Before you build or repair the old home have your architect write us for book telling of "Stonekote" Portland Exterior. What color would you like a sample to be; Gray, Silver Gray, White, Buff, Red, Brown?

THE GARDEN CITY SAND COMPANY
MANUFACTURERS
709-11 Chamber of Commerce CHICAGO, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE STERLING WAY TO SUCCESS.

A great many contractors as well as builders and mechanics imagine that the ordinary transit or level is an instrument so complicated and so intricate in its operation that only the skilled engineer or surveyor can use it. While it is true that the more elaborate operations in surveying and engineering should be under the direction of a trained man, there are many operations in which the intelligent mechanic can and should use an instrument. Such work as laying out foundations, leveling footings, floors, sidewalks, etc., can readily be done by any man of ordinary intelligence or by any man who can tell time or set a watch. Any mechanic who can use a carpenter's level or plumb with accuracy can use the simpler forms of builders' levels or transits. By the use of these instruments far greater accuracy is obtained in much less time and the average owner or architect, seeing the contractor or mechanic using first class instruments of this character, knows that the work is being properly done.

The Iszard Warren Company, 136 North Twelfth street, Philadelphia, Pa., are makers of high grade instruments, not only for surveyor's use, but also for builder's operations. Their latest catalogue entitled "The Sterling Way to Success" not only describes their instruments in full but gives plain and comprehensive instructions for using and adjusting their instruments. We are advised that this catalogue, or rather treatise on surveying instruments, will be sent to such of our readers as indicate their interest in it.

COMPO COMMENTS.

The Northwestern Compo-Board Co., 5776 Lindale avenue, No., Minneapolis, Minn., designed their compo-board with the idea of preventing any tendency to warp or twist from exposure to the elements or to direct heat, such as is met with in proximity to steam pipes, radiators, etc. While the manufacturers at first had a limited idea of its uses, their numerous customers found many places where it could be used to advantage. A number of these have been collected in a neat pamphlet entitled "Compo Comments," which gives the letters of the users and indicates to a certain extent the wide variety of uses possible with this material. This pamphlet is sent on request to those who anticipate the use of wall board.

HARDWARE SPECIALTIES.

In many sections of the country it will soon be necessary to take down screens and put up storm sash. The question now comes up—were these properly provided with suitable hardware to make this change without considerable annoyance and labor?

The Diehl Novelty Co., Sheboygan, Wis., besides their other hardware specialties make an interchangeable hanger such that the change from screens to storm sash, or vice versa, can

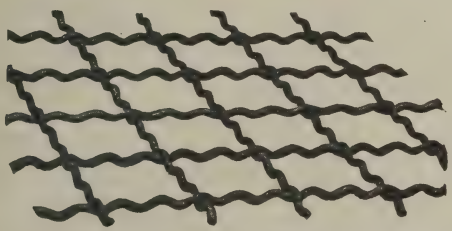
BUFFALO
WIRE WORKS CO.

FORMERLY
Scheeler's Sons

Manufacturers of

WIRE CLOTH

Crimped Wire Concrete Reinforcement, Plain and Galvanized, in all size meshes and Gauges of Wire.



WIRE WORK

Plain and Galvanized Wire Lathing, also Grimm's Galvanized Corrugated Wire Lathing.

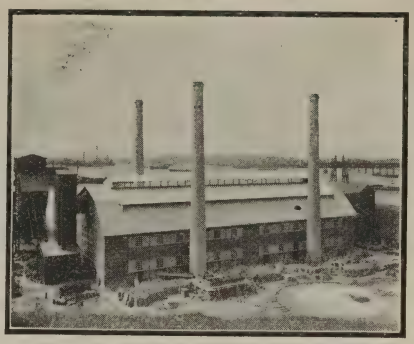
Buffalo Wire Fencing.

ARTISTIC METAL WORK
AGENTS FOR
Clinton Electric Welded Fabric

Samples and Prices Upon Application
SEND FOR OUR No. 5 CATALOG.

442 TERRACE

BUFFALO, N. Y.



Asbestos Corrugated Sheathing on the Retort House of the Providence Gas Co., Providence. R. I. Engineers and Contractors, Didier March Company, New York. Roofers, C. G. Brunnckow Company, Providence

Asbestos Corrugated Sheathing

Architects and Builders whose practice demands a **fireproof sheathing material,** as in roofs and sidings in Elevators, Train Sheds, Warehouses, Rolling Mills, Etc., should get posted on Asbestos Corrugated Sheathing.

This sheathing is used with great success on many of the most important buildings of this kind in every part of the country.

Has ample structural strength. Positively fireproof. Cannot rot, rust or disintegrate with time or climatic conditions. Never requires painting.

Write for Booklet B, "K & M," 1912, with trade prices and terms

Keasbey & Mattison Co.
Factors
Ambler, Pennsylvania

Branch Offices in Principal Cities of the United States

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

FASTENS ANYTHING TO MASONRY

Absolutely the cheapest and quickest means of fastening fixtures of all kinds to Concrete, Brick, Stone, Marble or Tile Floors, walls or ceilings. Guaranteed to hold.

THE VAN EXPANSION BOLT
SPECIAL TRIAL OFFER

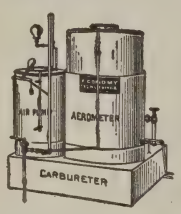
25 size 3/16" complete
15 " 1/4" with screws
10 " 5/16"
$1 Send a Dollar Bill Today

Money refunded if not satisfactory. Larger sizes on request. Write for free sample and booklet, "Expansion Bolt Facts."

Normal Expanded

VAN EXPANSION BOLT CO.
415 Fort Dearborn Bldg., CHICAGO

Automatic Safe-Sanitary Gas Light and Fuel

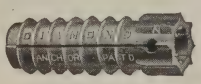


Best for cooking and heating water for kitchen, bath and laundry.
No charging, no cleaning.
No generating, no dirt, soot, fuss or muss.
Cheaper than electricity, cleaner and safer than kerosene or acetylene (in use 16 years.)

Today is the time to write HOME department of
ECONOMY GAS MACHINE CO., 437 E. Main St., Rochester, N. Y.

DIAMOND EXPANSION BOLTS

Diamond "N" Screw Anchor
For fastening all kinds of material to brick, stone or concrete



Diamond "N" Shield

Diamond "N" Steel Drill

DIAMOND EXPANSION BOLT CO. 90 WEST ST NEW YORK

SHINGLING HATCHETS
WITH POSITIVE GAUGE
No. 144
OVAL HEAD. 169 POINTS.

Gauges by 1/4 inches from 4 1/4 inches to 5 1/2 inches. Full Polished Solid Tool Steel, the best Quality ever used in a Hatchet.

If your dealer does not carry these Hatchets we will send you one, express prepaid, upon receipt of $1.75.

L. A. SAYRE & SON
340 Mulberry St., NEWARK, N. J.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

be made in a moment. This is only one of a number of interesting specialties made by the Diehl Novelty Co., the complete list of which is shown in their illustrated catalogue. This catalogue is sent on request.

SOLID HEAD EXPANSIVE BITS.

The necessity for boring holes of large diameter led to the invention of the expansive bit. As formerly constructed, this tool was so made that a large portion of the head was cut away, greatly weakening the tool, and at the same time the design was such that in a short time the working parts became loose and it was impossible to keep the cutting edge from slipping or creeping.

The Russell Jennings Mfg. Co., Chester, Conn., have long been making auger bits of various styles, and turned their attention to the design of an expansive bit which would overcome the objection to those already in use. The style which they have adopted is known as the Russell Jennings Solid Head Expansive Bit, and they claim it is the strongest on the market. Precise adjustment is remarkably easy, as the adjusting screws are made to change the diameter of the hole one-eighth of an inch for each complete turn. Creeping of bit is prevented by a simple clamping screw, so arranged that none of the actual strain comes upon it and there is therefore no possibility of its working loose.

The Russell Jennings Mfg. Co. have so many different styles of bits for various purposes that the reader is requested to send for their complete catalogue or write to them regarding special needs in this line.

FALL IMPROVEMENTS.

Now is the time to consider the various improvements and alterations. During the summer months everyone has been busily engaged on new work, and much of the repair work, changes, etc., have been put off until there shall be a little more time. With the coming of winter, one wants to have everything in perfect condition, and whatever changes are made should be made before the cold weather is upon us.

Perhaps you have been considering fitting up an attic room, or perhaps there is a space in the basement which needs a little better finish than the rough walls and bare joists. To one having problems of this character to deal wtih, the use of Bishopric wall board presents advantages. This board is made in sheets four feet square, which are easily nailed in place by any carpenter or intelligent workman. The size of the sheets permits rapidly covering any desired surface, while they are not too large to be readily handled by one man.

When Bishopric wall board is used, it is not necessary to plaster the walls, as the surface of the board is ready for any desired decoration. The many places in which a material of this character can be used is shown in a recent catalogue issued by the Mastic Wall Board & Roofing Co., 328 Este Ave., Cincinnati, O., who will also send samples, working plans for model houses, etc.

SAY!

YOU KNOW THERE IS MONEY IN

METAL CEILINGS

IF

THE PRICE IS "RIGHT"

That's why you should get Catalog D N and Discounts

Our Prices are Right and so are the Goods

THE KANNEBERG ROOFING & CEILING CO.

CANTON, OHIO

Bonnell Iris Aggregate

Crushed Granite from the beautiful IRIS (PORPHYRY) quarries—screened to all sizes for concrete and cement work.

Strongest, most desirable and best bonding aggregate for concrete work on the market—we can prove it.

IRIS PORPHYRY in its natural state is beautiful in its wealth of color and glitter and when used in concrete or cement gives a life and color that cannot be obtained with any other material. The colors—pink, green and black—in the granite give the aggregate the appearance of crushed jewels.

For Flooring this material will probably outwear marble terrazzo two to one, besides producing far handsomer effects.

For Stucco Work additional value will be given buildings through the beautiful effects resulting from the use of IRIS AGGREGATE in the mixture, also in poured concrete and cement blocks.

For Sidewalks it gives a hard beautiful finish that will last indefinitely.

SPECIAL OFFER

For $1.00 we will send you 100 lb. bag of Iris Aggregate divided in two lots of any two screens desired. Fill out the coupon at once and mail. Anyhow send for sample and literature.

E. H. Bonnell
501E Fifth Avenue
New York City

Herewith is $1.00 for which please send me 100 lbs. of two sizes of IRIS AGGREGATE by Freight or Express as a trial or sample order. Send me prices per ton and literature.

Name.....
Address.....

E. H. Bonnell

501E 5th Avenue New York City

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE PLAN SHOP BUNGALOWS

designed for

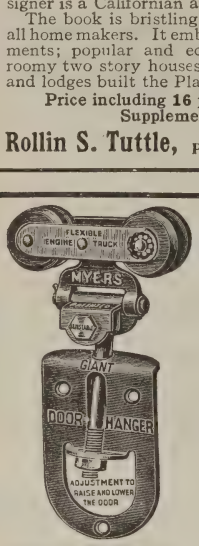
Northern ClimateS

combine the artistic beauty of California bungalows with the structural requirements of the Northern homes. The designer is a Californian and knows the bungalow by heart.

The book is bristling with interest and suggestion for all home makers. It embodies successful, compact arrangements; popular and economical story-and-half designs; roomy two story houses of individuality and cosy camps and lodges built the Plan Shop Way.

Price including 16 page supplement, Fifty Cents
Supplement alone, Ten Cents

Rollin S. Tuttle, Architect. P. O. Box 3242 **Boston, Mass.**



MYERS GIANT

and New-Way Adjustable Tendem Door Hangers

PATENTED

For Tubular Girder Track

Are adjustable up or down, and in or out. Trolley Wheels are heavy turned steel, revolving on steel roller bearings, and run inside the tubular girder track. Not affected by rain, sleet or ice. Write for descriptive circulars and prices.

F. E. MYERS & BRO.
ASHLAND, OHIO

Van Dorn's Steel Joist Hangers

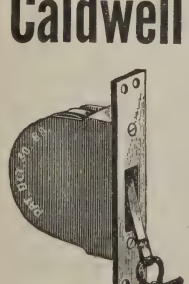
Have no Equal. Send for Catalog

No. 1. Steel Joist Hanger for Wood Header.

No. 4. Steel Joist Hanger for Brick Walls.

VAN DORN IRON WORKS, Cleveland, Ohio

Caldwell Sash Balance



Does away with weights and cords and **vastly** more durable. Makes sashes work perfectly. Permits greater window space in new work, as box frames are not necessary. May be applied to old windows without altering sashes or frames.

Write for Circular to the

Caldwell Mfg. Company
2 Jones Street Rochester, N.Y.

SUN PARLORS AND SLEEPING PORCHES.

The wide spread dissemination of information regarding the advantages of sunlight during the day and plenty of air by night as a means of promoting health has led the Southern Cypress Mfrs. Ass'n., 1212 Hibernia Bank building, New Orleans, La., to issue a most valuable booklet on these subjects. The booklet known as Vol. 35 of the Cypress Pocket Library contains a large number of plans, photographs, and descriptions of sleeping porches and sun parlors which have been incorporated in new buildings and built into old ones. The plans shown are very complete and have been prepared by representative architects in various sections of the country where work of this character has been erected, thus making them representative designs which may be added to existing buildings.

In view of the fact that no substitute for fresh air has been found, it is very necessary that those who go from their offices or from the shops and factories where the air is not absolutely pure should give every attention to having plenty of fresh air during the hours of the night. It is a prevention of such diseases as pneumonia and tuberculosis, as well as a restorative of the energy necessary to carry out the next day's duties.

But there are those who perhaps are better situated during the day and how much more necessary it is for them that their nights should give them the same life giving air. Why should those who have leisure for outdoor sports and recreation during the day deprive themselves of fresh air at night?

The construction of rooms of this character being very open renders the materials particularly subject to the moisture of the air and dampness during inclement weather. For this reason only the most suitable materials should be used. It has been found that no wood withstands these conditions better than cypress, and the Southern Cypress Mfrs. Ass'n believes that they are turning out the material best fitted for these structures.

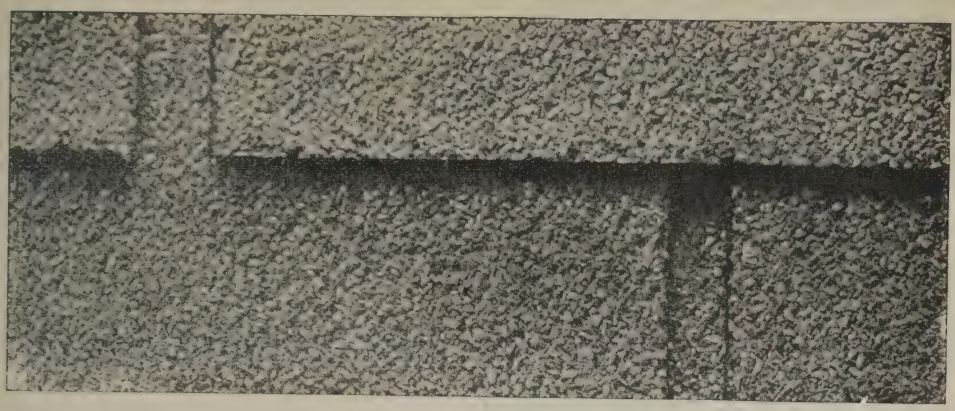
We understand that these booklets will be sent to those who are interested in fresh air, sun parlors and sleeping porches.

MODERN GRILLES.

Catalogue No. 19 of the Chicago Grille Works, 826-838 Wells street, Chicago, Ill., indicates that this company is keeping up with all of the advance made in modern construction and design. The many designs shown in this catalogue of grilles, colonnades, consols, and columns indicate that they are prepared to turn out the highest grade of work in their line. It is especially noticeable that their long establishment in one place insures that they have been providing themselves with proper materials and equipment to carry on their work.

This catalogue is of interest to the carpenter and builder and we understand that it will be sent to our readers on request.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



If you haven't sent for that free sample yet you are certainly losing mighty valuable time

FLEX-A-TILE
ASPHALT SHINGLES

are the most remarkable roofing material of this twentieth century.

They are made of solid asphalt. The surface is chipped slate or granite rolled in under heavy pressure until it becomes an actual part of the shingle. The colors are natural slate and granite. No dye or coloring material. They can't fade or wear off. They are there to stay as long as the house lasts.

Flex-A-Tile Shingles are 8 inches wide by 12½ inches long. Only takes 420 of them to cover 100 square feet. They are easily and quickly laid. Are absolutely weatherproof and highly fire resisting. As durable as slate and less expensive than stained wood shingles.

WE WANT TO SEND A FREE SAMPLE TO EVERY CARPENTER AND BUILDER IN THE COUNTRY

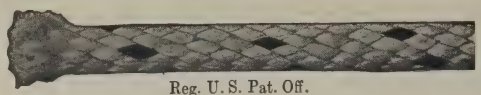
SEND YOUR NAME

The Heppes Company

Forty-fifth Street, Chicago, Illinois

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

SAMSON SPOT SASH CORD



Reg. U. S. Pat. Off.

Made of extra quality stock, carefully inspected and guaranteed free from the imperfections of braid and finish which destroy common cords so quickly.

The Spots on the Cord, in any color, are our trade mark. Don't be misled by imitations. Samples and full information gladly sent.

Samson Cordage Works
Boston, Mass.

Reg. U. S. Pat. Off.

THE HAN-COT SASH MOUSE

for placing sash cord in window frames.
59 inches long, consisting of Fastener, Chain and Weight.

WHY use the old "string and nail" outfit, when the HAN-COT will do it quicker and easier?

At your dealer's, or **sent postpaid for 30 cents.** **Handley & Cotterman, Mfrs., 164 N. Wabash Ave., Chicago.**

HAVE YOU POWER BORING MACHINES?

IF SO, No Sash Pulley Can be Classed with the

Grand Rapids No. 12

Mortised at one Punch with the Quadruple Bit

or bore four holes with a single bit and it's done.

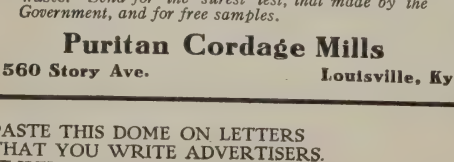
No cutting, fitting nor trimming. Saves time and money. Write for Free Samples.

Quadruple Bit, Price $5.00 Can not be used in a hand brace.

Grand Rapids Hardware Co.
118 Pearl St., Grand Rapids, Mich.

Details of Building Construction. By Clarence A. Martin, Asst. Prof., Dept of Architecture, Cornell University. 33 Plates, 10x12½ inches. Intended as a reference manual on the best methods of frame construction. Over 300 separate detail drawings are shown, covering all the ordinary details of construction. In many cases alternative methods are shown. Postpaid... $2.00

Hodgson Book Company
539 S. Dearborn St. **Chicago**



Regal Sash Cord is always marked with **Two Blue Strands.**

This sash cord has been approved by the United States Government and many leading architects. It will outwear the best chain 3½ times. It is perfect in construction and, therefore, without waste. *Send for the surest test, that made by the Government, and for free samples.*

Puritan Cordage Mills
1560 Story Ave. **Louisville, Ky.**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

CYCLONE PROOF CONSTRUCTION.

The Trussed Concrete Steel Co., 384 Trussed Concrete building, Detroit, Mich., advise us that they have just received the following letter from their representative at Regina, Sask.:

"Regina, Sask.,
"July 2, 1912.

"The recent cyclone in Regina, has shown up very plainy the advantages of Kahn System building, especially in the case of the Regina College, which was practically in the heart of the storm. The partitions of this building were entirely removed, but the reinforced concrete skeleton remained exactly in place. The representatives of Brown and Vallance, Montreal, has written to his head office explaining this. He is particularly impressed with the fact that the Kahn System has given them a building which, in addition to being fireproof, is absolutely cyclone-proof."

Instances such as this go a long ways to promote the construction necessary to withstand the extremes in the elements, such as cyclones, floods, and fire. The Trussed Concrete Steel Co. have long been foremost in the design of structures of this character and it is gratifying to them to know that when the real severe tests come, their plans have been found adequate to withstand the utmost fury of the storm such as raged at Regina.

ASBESTOS BUILDING LUMBER.

Among the various styles which have proven popular from time to time, none is more artistic and lastingly pleasing than the half timber construction. The panel effects of the oak timbers, as seen in many old English houses, is an effective method of breaking up which would otherwise be masses of monotonous color. While formerly it was customary to fill these panels with stucco or plaster, there were numerous objections to this form of construction for many climates. Inclement weather played havoc with it and one soon saw patches of bare lath through which moisture and snow and wind could enter the building.

The Keasbey & Mattison Co., Ambler, Pa., recently designed a material composed of asbestos fiber and cement which possesses unusual merits for this form of construction. The sheets are of sufficient size to fill any ordinary panel, and from its ingredients is both fireproof and permanent. Under the name of Asbestos Building Lumber, they are placing this material on the market, where it is needed with extraordinary favor.

The Keasbey & Mattison Co., have recently prepared a neat pamphlet showing a large number of houses in which this material has been used. The plans of these buildings were prepared by some of the best architects in the country and show the varied possibilities of the material. A limited number of these pamphlets are available and interested readers are requested to write for them.

"Be the Bungalow Man of Your Town."

Specialist

Contractor

Carpenter

Build with Red Cedar Shingles "from crest to foundation."

Write For Our

FREE BUNGALOW BOOK

It contains practical helps on bungalow building, photographs, floor plans by leading bungalow specialists and facts about

Washington Red Cedar Shingles

Everybody likes dwellings covered "from crest to foundation" with Red Cedar Shingles. First and last they cost less. You stain them once while you paint clapboards twice; they do not warp and will outlast any frame house.

There is just a step or two from plain house builder to Bungalow Specialist—from competition to comfortable money-making.

Write today. Send postal for our helpful book.

We have no plans to sell. We are manufacturers of Red Cedar Shingles, selling through your dealer.

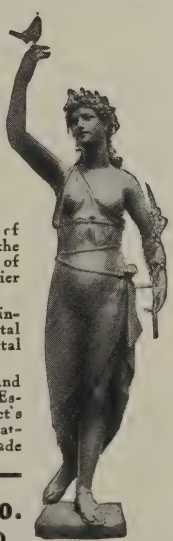
RED CEDAR SHINGLE MFRS. ASS'N

Representing Over 200 Mills Daily Capacity Over 20 Million

497 Arcade Annex, Seattle, Wash.

Sheet Metal Statuary of Rare Artistic Worth

WITHIN the last quarter of a century there have been reproduced at the Mullins factory, Salem, Ohio, statues of Sheet Bronze and Copper that are nothing short of marvelous. Many of them were made from the models of famous sculptors, to their entire satisfaction.



We are prepared to reproduce, in minute detail, the most delicate lines of any model. It is this faithful portrayal which helps to account for the world-wide fame of Mullins Sheet Metal Statuary. Diana on the top of Madison Square Garden, the group on the New York Life Building, the Statue of Progress, Chicago, are among our earlier achievements.

We also make Fireproof Metal Windows, Skylights, Cornices, Finials, Metal Tile Roofing and Sheet Metal Ornamental Work of every description.

Tell us what you're interested in and we'll send the proper catalogs at once. Estimates promptly submitted on architect's drawings. Attractive prices. Quick, satisfactory service. Discounts to the trade on application.

The W. H. Mullins Co.

210 Franklin St., SALEM, O.

Specify Paint That Is Scientifically Prepared

Lowe Brothers High Standard Liquid Paint

—The Paint of Performance

is scientifically made. All the parts have a strong affinity for each other without a harmful reaction, thus making a paint of greatest cohesive and adhesive power that will resist the destructive weather elements.

Mellotone

the modern High Standard interior coating, is the most beautiful of all flat wall finishes. It is washable, sanitary, durable and fadeless.

When you specify any "High Standard" products you can ***know*** that your work will show up to best advantage.

WRITE FOR FREE BOOKLETS and color samples of HIGH STANDARD products. There's a Lowe Brothers Paint, Varnish, Enamel or Stain for every purpose.

THE LOWE BROTHERS COMPANY

473 E. Third St., Dayton, Ohio

Boston New York
Chicago Kansas City

Lowe Brothers, Lim., Toronto Can.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE NEW "COMPLETE" SAW SET

A glance at this cut will convince you that every practical, common sense feature is embodied in this tool. A few of which are: Adjustable side gauge which brings the point of each tooth under the anvil. Top Clamp Screw when adjusted, regulates the amount of set. The setting or wearing surfaces are made of Tool Steel and carefully hardened. Front Screw holds down Saw, allowing free use of left hand. Compact, attractive and low in price. Black, 75c. Nickel, $1.00. Order of your dealer or a sample will be sent on receipt of price.

OTIS A. SMITH, ROCKFALL, CONN.

WORK BENCHES

Rapid Acting Vises
Drawing Tables
Drawing Boards
Drawing Cabinets
Electrotype Cabinets

We also make Turnings and Special Wood-work of all kinds to order. Don't buy until you get our Catalogue and prices.

Henry Rowe Mfg. Co. NEWAYGO, MICH.

A Tool Bag For You

Mason's, Joiner's, Carpenter's

Mason's Tool Bag.

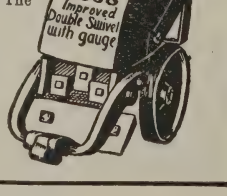
In fact we make Tool Bags in Canvas and Leather for every Mechanic. Want our Catalogue?

Excelsior Bag & Mfg. Co.
TROY, N. Y.

It Works Like a Plane

The Boss Floor Scraper

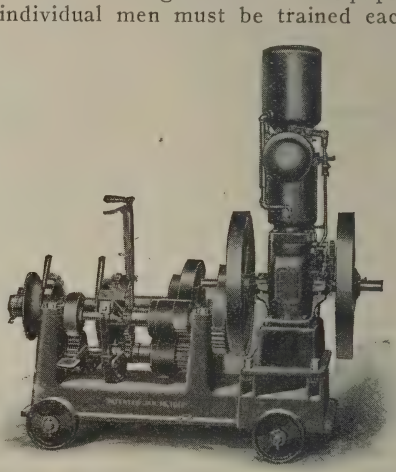
The Boss is the only Floor Scraper made that will plane a floor without leaving a square cut where knife first starts cutting. WHY? Because the Boss is made with a gauge on front to which is attached a pear shaped wheel which raises when the machine is pulled and lets the knife down gradually. ¶ The Boss can be set for any thickness of shaving. It also can be set for any shearing cut; right or left, up or down, to suit the kind of lumber. ¶ It is guaranteed to give absolute satisfaction.



G. J. KEPPLINGER
Main Office, Dwight, Ill.
MANUFACTURED ALSO IN CANADA

HOISTING MATERIALS

Many small contractors seem to be at a loss to understand how the larger concerns carry on their business, and how they are able to secure large contracts at remunerative figures and carry them out with rapidity. In many cases, and in fact practically all cases, it is a matter of organization and equipment. The individual men must be trained each to do his particular duties and they must be provided with suitable machines and apparatus to carry on their work with expedition.



One of the chief problems of the contractor is to keep the men in material. On a small one-story building this can be done without special equipment, but as soon as one goes above this, some style of hoist must be provided to take the material up.

The Waterloo Cement Machinery Corp., 111 Vinton street, Waterloo, Ia., have designed an outfit for the use of the up-to-date contractor, by which material is raised by a hoisting machine equipped with a gasoline engine. This equipment is made in various sizes to fit the needs of different conditions and by its use the small contractor is provided with facilities for carrying on work of considerable magnitude.

The recent catalogue issued by the Waterloo Cement Machinery Corp. shows this machine in detail and describes fully its installation and operation.

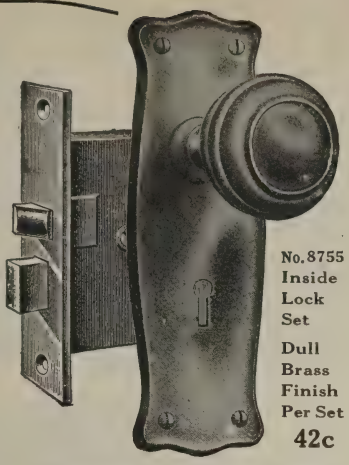
SHARPENING STONES AND ABRASIVE SPECIALTIES.

The Pike Mfg. Co., Pike, N. H., have recently issued their catalogue No. 10, dealing with their complete line of sharpening stones and equipment. The catalogue describes how these stones are found and manufactured and contains an assortment interesting to the contractor, carpenter and those concerned in keeping a sharp edge on their tools. We understand that the Pike Co. will send this catalogue free, provided the National Builder is mentioned.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Have YOU Seen Our

Builder's Hardware Catalog and Net Price List



No. 8755 Inside Lock Set
Dull Brass Finish
Per Set
42c

We will send it postpaid to Contractors and Material Men and Carpenters. We do not sell to contractors or carpenters in Cook County, Illinois.

Rehm Hardware Co.
1503 Blue Island Avenue
CHICAGO, ILL.

Move the Old House to Another Lot
Instead of Wrecking It
You Can Make More Money by Doing So

THE LA PLANT HEAVY HOUSE MOVING TRUCKS ARE MADE OF STEEL

On scientific lines—are interchangeable so they can be worked singly, in pairs or in fours.

WRITE FOR CATALOG N

and see how easy it is to wheel a building a mile in a day—and how little the cost is for La Plant outfit compared with the profit to be made in moving houses instead of wrecking them.

LA PLANT TOOL CO.
900 E. Nevada St., Marshalltown, Iowa

Your Stucco or Concrete House Needs Bay State Brick and Cement Coating Protection.

The coating does not destroy the distinctive texture of concrete, protects against dampness and moisture and has been endorsed by the National Board of Fire Underwriters as a fire retarder. It comes in different colors.

Let us send you a booklet that tells you all about it. It has been used by the best architects, contractors and builders as a coating in light as well as heavy construction of every kind; houses, mills, breweries, garages and railroads.

It is very effective as a tint for interior decoration on wood, cement or plaster.

Send for Booklet No. 10

Wadsworth, Howland & Co.
Incorporated
Paint and Varnish Makers and Lead Corroders
82-84 Washington St., Boston, Mass.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

50 CENTS FOR THIS GUARANTEED CLAMP FIXTURE

Used By CARPENTERS CABINET MAKERS CRAFTSMEN

Unequaled for Strength Quick Action and Durability

COMPLETE CATALOG OF TIME AND LABOR SAVING CLAMPS, VISES, TOOLS, ETC., FREE

E. H. SHELDON & CO. 178 Nims Street MUSKEGON, MICH.

Last a Lifetime and Give Satisfaction to the End!

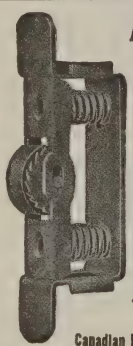
The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalog. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book, "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

D. R. BARTON. 1832. ROCHESTER, N. Y.

MACK & CO., Sole Makers

Brown's Race Rochester, N. Y.



Automatic Sash Holders

Do away with Sash Weights, Cord, Pulleys Pocket Frames, Etc.

A positive and durable device that holds window in any position desired and that cannot get out of order.

For old as well as new windows. No broken cords, no binding pulleys, no rattling windows.

And they are economical—Made in three styles, for sash weighing up to 8 lbs., up to 20 lbs. and to 35 lbs. and more.

If your hardware dealer does not have them send us $1.00 for a trial set, charges prepaid, together with your dealer's name.

ANYHOW send for literature and prices.

Automatic Sash Holder Mfg. Co.
48 Church St., New York

Canadian Representative, Smith Hardware Co. Ltd., Montreal, Quebec

$13.95 PER DOZ.

(If You Send Cash With Order)

The Taylor Steel Scaffold Bracket

Absolutely Safe,

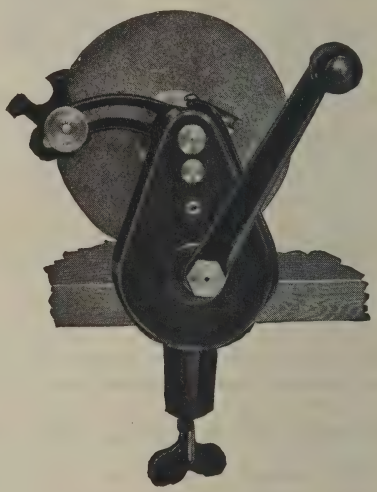
for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.

Write for Catalog of Builders' Specialties

James L. Taylor Mfg. Co.
Poughkeepsie, N. Y.

ANOTHER NEW LUTHER GRINDER.

In connection with most of the new abrasives now on the market the speed of the grinding wheel has everything to do with a grinder's efficiency. High speed adds to its rapid cutting quality, length of life, and the smoothness of the finished work. No matter how desirable a sharpening substance is, it cannot be expected to do good work unless it is run at a high rate of speed. High speed is a feature of all Luther Grinders, but more especially of the new design. It has by far the highest speed of any machine on the market today. The only grinders that can approximate its surface speed are those in the large machine shops. As a matter of fact any higher speed would be dangerous.



Luther Grinder No. 104.

This new Luther Grinder has a speed of 30 revolutions of the grinder wheel to every turn of the driving handle. At the same time it is easy running, for the gears are exceptionally wide, with long, one-piece bearings. These are cut from solid steel blanks. The entire frame is in one piece, with all machine parts inclosed and dust protected.

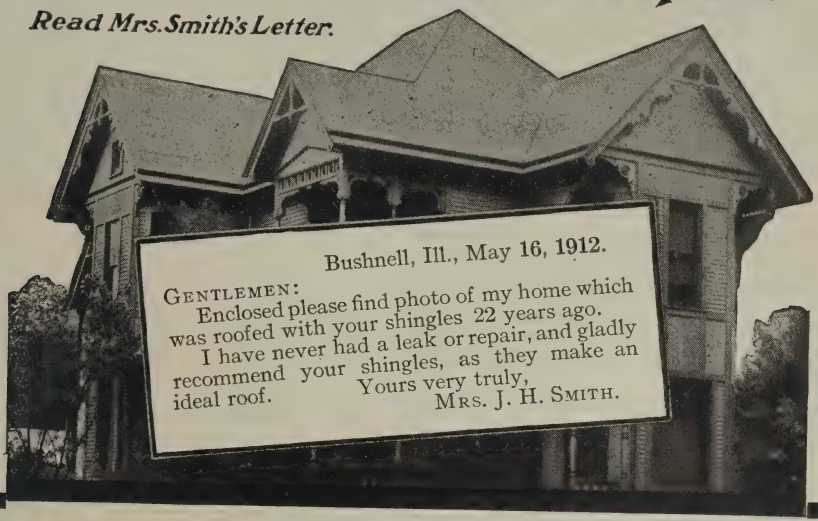
Equipped with a four-inch Dimo-Grit sharpening wheel it is known as Luther Grinder No. 104; with a five-inch Dimo-Grit sharpening wheel it is known as No. 105. It also has Luther's patented chisel guide and tool rest, by which a true even bevel can be given to any edged tool.

The Luther Grinder Mfg. Co., 1119 Michigan street, Milwaukee, Wis., are manufacturing this machine as well as a complete line of grinders for practically every conceivable purpose. Their complete catalogue will be sent on request, or special problems will be carefully considered and the proper machine and outfit recommended.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

22 Year Old Cortright Roof "Never Had a Leak or Repair"

Read Mrs. Smith's Letter.


Bushnell, Ill., May 16, 1912.
GENTLEMEN:
Enclosed please find photo of my home which was roofed with your shingles 22 years ago.
I have never had a leak or repair, and gladly recommend your shingles, as they make an ideal roof.
Yours very truly,
MRS. J. H. SMITH.

THIS durability of **CORTRIGHT METAL SHINGLES** is going to interest the house owner every time, and you profit in many ways.

1st. Cortright Metal Shingles do not cost any more than slate or wood in most sections of the country.

2nd. Any good mechanic can lay Cortright Shingles and do it in less time than it takes the slate or wood shingle roofer.

3rd. They require very much lighter framing than slate, being one-eighth its weight, and save you a big expense on lumber.

Let us tell you the many other ways you profit with Cortright Metal Shingles, and the big advantage of our special Contractors' and Builders' proposition.

It will pay you to write us now.

CORTRIGHT METAL ROOFING CO.

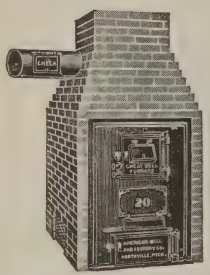
PHILADELPHIA AND CHICAGO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Fireproof Metal Windows
Skylights, Ventilators
Sheet Metal Goods

Send for Catalogue No. 6

Willis Manufacturing Co.
Galesburg, Ill.



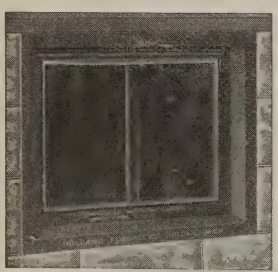
A Hot Air Furnace

For Less Than $50 Complete
FOR 5 AND 8 ROOM DWELLINGS

An unheard of Price and a most Remarkable and Indestructible Furnace. No Pipes—no Lost Heat.

American Bell & Foundry Co.
NORTHVILLE, MICH.

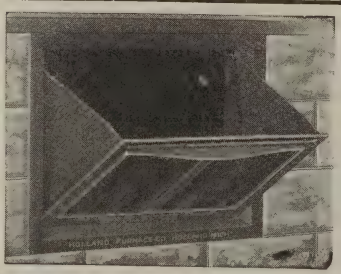
The Improved Window Chute



A Real Glass Window when closed, which is burglar proof

A Perfect Coal Chute
when open

LOCKS FROM OUTSIDE AND CAN ONLY BE UNLOCKED FROM INSIDE



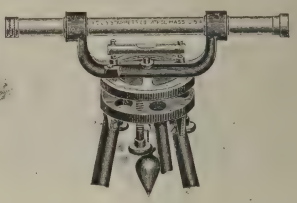
Write for Proposition to Contractors and Builders

HOLLAND CO., Holland, Mich.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

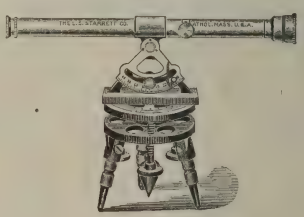
STARRETT TRANSIT AND LEVEL.

Because of the high price of engineers' instruments, carpenters, contractors, and master builders are frequently compelled to hire an expensive civil engineer to lay out foundations or run levels for drains and excavations and similar engineering work. The builder could do this himself if he had suitable instruments



to work with, but the levels and transits ordinarily used by engineers have complicated devices for use on special work and work of wide range and are so high in price that he cannot afford the outlay for the comparatively few times he could use them. He therefore is compelled to wait the pleasure of the civil engineer and pay him enough to buy a simple instrument.

The transits made by the L. S. Starrett Company, Athol, Mass., makers of machinists' and



carpenters' fine tools, cost less than one-quarter as much as most engineers' instruments because they do not have the complicated attachments necessary for special work, yet they meet all the requirements of the comparatively simple work of the builder.

A leveling instrument also is made by the same company and this too is of moderate price. Both level and transit are described in the Starrett catalog No. 19M, which also describes other carpenters' tools such as stair gages, scratch gages, scrapers, squares, etc.

ESTIMATING EXPANDED METAL.

We have just received from the Northwestern Expanded Metal Company, 945-975 Old Colony building, Chicago, a very useful table by which the amount engaged of reinforcement necessary may be determined for slabs, beams, partitions, etc. There is also included a large amount of valuable information regarding plastering and stucco construction. We understand that the Northwestern Expanded Metal Company will be glad to send one of these tables to such of our readers as are interested in this form of construction.

NO PAINT *Ever* Needed on this Roofing

The need of paint or gravel on a roofing is positive proof of its weakness—positive proof that the materials in the roofing would dry out, rot, rust, decay or otherwise deteriorate without such protection—positive proof that the roofing itself can't last long unless protected with a *mineral*.

Instead of a perishable animal or vegetable material only *temporarily* protected with a *thin layer of mineral*, such as paint, slag or gravel, J-M Asbestos Roofing is *one solid mass* of *minerals*. Not a particle of perishable material in it.

J-M Asbestos Roofing consists of layer-on-layer of pure Asbestos Felt securely cemented together with genuine Trinidad Lake Asphalt. Asbestos is a rock, or stone, and of course stone needs no paint to make it last. And the Asphalt Cement between these stone layers is the same mineral that has withstood the severe duties of street paving for forty years.

So J-M Asbestos Roofing is an *all-mineral* roofing.

J-M ASBESTOS ROOFING

is the *only* ready roofing that never requires a single cent's worth of paint or other protection. Its first cost is its *only* cost.

Other ready roofings are a continual trouble and expense—for the paint and gravel wash and blow off and have to be renewed every few years.

Because of its mineral or stone construction, J-M Asbestos Roofing is also rust-proof, rot-proof and acid-proof. And fire that will melt iron won't burn this roofing.

If not at your dealer's, our nearest Branch will supply you with J-M Asbestos Roofing.

Get This Curiosity FREE

We want you to see the curious Asbestos Rock which yields the long, soft, pliable, yet practically indestructible fibres from which we make J-M Asbestos Roofing, Theatre Curtains, Stove Mats, and hundreds of other Asbestos products. We know it will convince you better than anything we can say that a roofing made of this indestructible stone must also be practically ever-lasting.

Simply send a postal to our nearest Branch and say "Send sample of crude Asbestos and your handsomely illustrated Book L 303".

H. W. JOHNS-MANVILLE CO.

BALTIMORE CLEVELAND ASBESTOS NEW ORLEANS SAN FRANCISCO
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STEEL CEILINGS

Are you figuring on using a medium priced Steel Ceiling? Get our catalog by all means. It shows a line of beautiful ceilings of sufficient variety to please almost any individual liking, yet at prices surprisingly low.

The possession of this catalogue and a knowledge of our line and prices will save you many a dollar if you are an occasional or frequent buyer of Steel Ceilings.

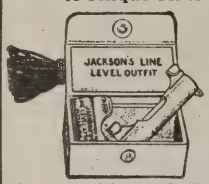
Write for It Today

INDIANAPOLIS CORRUGATING CO.

Indianapolis, Indiana

THE JACKSON ALUMINUM LINE LEVEL

A Unique Time and Labor Saving Device



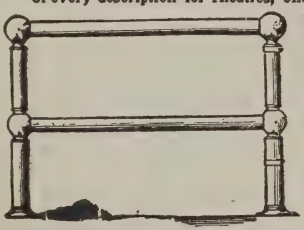
It takes the place of the old-fashioned sixteen-foot straight edge, yet it can be carried in your vest pocket. ¶ No contractor, builder, carpenter, mason, bricklayer, architect or plasterer should be without one. ¶ Just stretch your line and hang the level on it—it's positively accurate. ¶ The complete outfit is put up in a neat leatherette case and consists of the level with a 40-ft. line, also a spring clamp for attaching the level to a steel square or pocket rule, thereby serving as a plumb rule or bench level. At your hardware dealer's or sent for $1 postpaid. By registered mail 10c additional.

JOS. WOODWELL CO., Sole Agents, 201-203 Wood St., Pittsburg, Pa.

Write for Catalog of Woodworker's Tools

BRASS RAILS

Of every description for Theatres, Churches, Offices, Etc.



HAND RAILS
PUSH PLATES
KICK PLATES, Etc.
BRASS FRAMES
BRASS EASELS
BRASS GRILLES

For Theatre Lobbies.

LET US BID ON ALL BRASS WORK

Inducing Prices, High Class Workmanship. Send us list of requirements.

THE NEWMAN MANUFACTURING CO., | Established 1882
717-719 Sycamore Street, Cincinnati, O.

TO KEEP OUT DAMPNESS

Paint Your Concrete and Brick Buildings with TOCH BROS.

R. I. W. PAINT

"Remember It's Waterproof"

and your cement floors with **TOCH BROS. Cement Filler** and **Floor Paint**, Pat'd. Proof against Water, Acid, Fumes or Alkali. **Special elastic compound for each specific purpose**

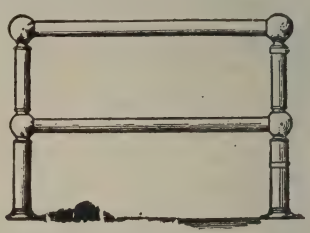
The Garden City Sand Co.

709-711 Chamber of Commerce, Chicago

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

ORNAMENTAL BRASS WORK.

The Newman Manufacturing Company, 717-719 Sycamore street, Cincinnati, Ohio, have recently sent out a neat circular describing and illustrating a few of their many products in brass. In this circular are shown the latest designs of easels and frames for use in theaters and other places of amusement. We note that they also make brass railings, such as are used for foot lights, boxes, balconies,



etc., as well as a complete line of brass wickets and cages.

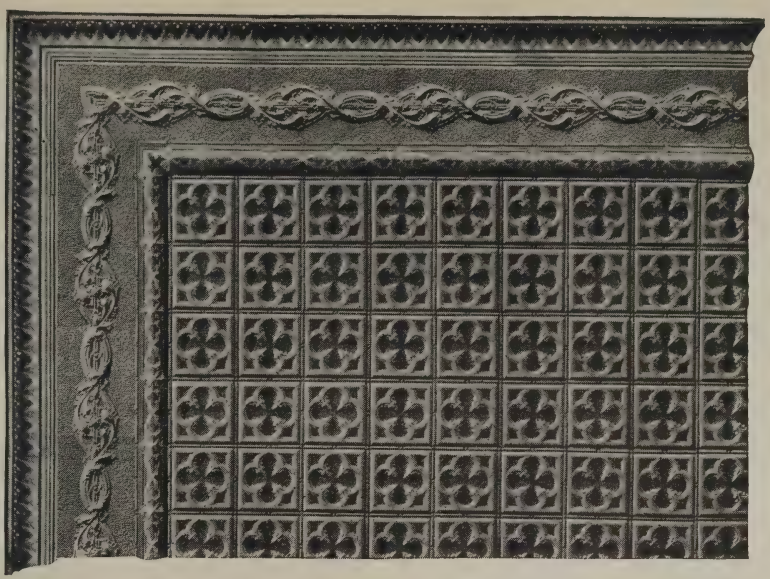
Work of this character requires special tools and machinery as well as great care and skill in the manufacture, as a great deal of this work is highly polished and the slightest blemish or imperfection in workmanship or material would be immediately apparent. The circular indicates that the Newman Manufacturing Company is well equipped for this character of work and we believe that our readers will make no mistake in consulting them before placing orders for work of this character.

THE FIREPROOF HOUSE.

Our readers are becoming familiar with the various types of fireproofing materials now on the market. They have read the descriptions of stone, brick, concrete, and tile houses, and are interested in any improvements in any of these materials.

To stimulate the design of fireproof residences, the National Fireproofing Company of Pittsburgh, Pa., recently offered prizes for the best designs of a house to cost not to exceed $6,000. From the many resigns submitted they have selected a large number and published them in the form of a beautiful booklet under the title of "The Natco House." This book includes also a series of attractive houses which have been built with their products. These houses were designed by some of the best known architects in the United States and show the floor plans and reproductions from photographs of the various buildings. This book is of interest not only to the advanced architect, but to the contractor, builder and designer as well.

The construction department of the National Fireproofing Company is a prominent part of this organization. Their long experience enables them to speak authoritatively on fireproof buildings, not only the large skyscaper, but the modest cottage as well. We understand that this department is at the command of our readers who are interested.



Edwards Metal Ceilings and Walls

CARPENTERS CONTRACTORS AND BUILDERS

Here is a chance for you to build up an independent, profitable business for yourself right at home. Many agents are now devoting their entire time to selling our Metal Ceilings. Others have made big profits simply devoting part of their time to selling and applying our Metal Ceilings and Walls. *Write us to-day about your territory.* Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that some one else will be given your territory. *Don't delay. Write today for our special agents' proposition and large, handsome catalog of attractive designs.*

The Edwards Manufacturing Company

"The Sheet Metal Folks"

430-450 Eggleston Avenue, Cincinnati, Ohio

Largest Manufacturers of Metal Ceilings, Metal Shingles, Steel Roofing and Siding in the World

Eastern Representatives: The W. H. Daycock, Jr., Co., 81-83 Fulton Street, New York

Branch Office and Warehouse: 1625-1627 Pacific Avenue, Dallas, Texas. J. F. Agnew, Manager

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LUFKIN

Steel Measuring Tapes

With Instantaneous Readings can be used at all times and under all conditions with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catalogue No. 12.

THE LUFKIN RULE CO.

SAGINAW, MICHIGAN, U. S. A.

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ARCHITECTURAL DRAWING MADE EASY

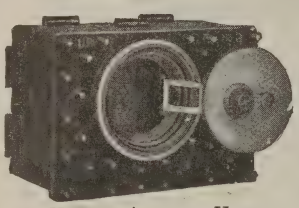
By I. P. HICKS

94 pages, illustrated and cloth bound, $1.00 postpaid. The best yet on drawing plans. Your money back if you are not satisfied with this book. Get a copy of

HICK'S ESTIMATORS' PRICE BOOK and your troubles in estimating are over.

170 PAGES—CLOTH BOUND—PRICE $1.00

I. P. HICKS, Box 22, Station A, Omaha, Neb.



The GALE WALL SAFE

It makes your Valuable Papers, Jewelry and Silver secure against Porch Climbers, Petty Thieves, Fire, etc.

No Home or Apartment House complete without one. It has a combination lock.

Write for Descriptive Matter Today

WILLIS MFG. CO., Galesburg, Ill.

FRED LIEBRICH, Agent for Cook County
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PRODUCERS OF

ROOF SLATES

BLACK — GREEN — PURPLE — RED

SLATE BLACKBOARDS Guaranteed Strongest and Best Finish.

Pamphlet with setting instructions on application.

The E. J. Johnson Co., Main Office: 38 Park Row, New York
Branch Office: 626 Park Bldg., Pittsburgh. Quarries: Pennsylvania and Vermont

ART of PRACTICAL WOOD CARVING

By Fred T. Hodgson.

PRICE: 12MO, CLOTH $1.50; HALF LEATHER $2.00

THE lessons given in this new book lead the young workman by easy steps until he is able to turn out work of a creditable character. The use and care of carvers' tools are given and explained and the tools described and shown by illustrations, with methods of sharpening and honing the tools. All kinds of appliances are shown, described and illustrated, for holding the work, and for preparing the tools and finishing up the carvings. The various styles of carving are fully described, such as Flat Carving, Chip Carving, Incised Carving, Scratch Carving, Figure Carving, Carving in Relief, Round Carving and Jewelry Carving. *Sent postpaid on receipt of price, by*

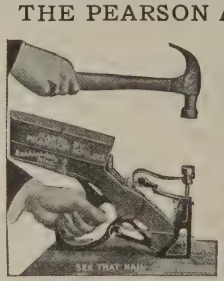
HODGSON BOOK CO, 542 S. Dearborn St. Chicago

THE STANDARD PORTABLE COMBINATION WOODWORKER.

In designing their Standard Combination Portable Woodworker, the Atlantic Engine Company, Mercer street, Meadville, Pa., had in mind a machine so simple in its construction that any mechanic could operate it; at the same time a machine so complete that it would perform all the various work required by the average contractor. Each part of the machine was carefully designed for its particular purpose; the engine being practically proof against such troubles as usually arise from inexperience, so that the careless workman could scarcely put it out of commission. A complete tool equipment is included with each machine so that there are no extras to buy after the machine is once in place.

The Atlantic Engine Company have a long list of satisfied users in all parts of the country and can usually refer the intended purchaser to someone in his locality who already operates one. Their catalogue shows the machine in great detail and the machine has every appearance of being designed for the man who values ample power and good tools.

THE PEARSON AUTOMATIC NAILER



With the coming of winter and the prospect of snow and cold the carpenter realizes that the old fashioned methods of nailing means cold fingers and much discomfort. To avoid these the Pearson Automatic Nailer is especially designed. By the use of this handy machine, or really a tool, the carpenter can drive shingle nails as fast as he can count—a rate of one hundred and twenty-five to one hundred and fifty per minute being possible even when one is wearing heavy gloves or woolen mittens. In fact, the machine works as fast as one can swing a hammer.

The Pearson Nailer is made in a number of sizes for various sized nails and other conditions. It is also made for driving tacks and brads and when so desired can be made up special for other nailing purposes.

The Pearson Mfg. Co., Robbinsdale, Minn., have just issued Circular 10, which describes these nailing machines in detail. Carpenters and others interested are requested to write to them for this catalogue as well as for particulars regarding agencies where the tools are not already on sale.

TITELOCK METAL SHINGLES.

When shingles are mentioned, one naturally thinks of wood, as this has been the material of which shingles have been made for many years. There have recently been made, however, a number of sheet metal shingles which possess certain advantages over those made of wood, as well as over tile and slate. Metal

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

For real endurance

You who really want your roof to ***stay*** waterproof—get

Genasco

THE TRINIDAD-LAKE-ASPHALT

Ready Roofing

Trinidad Lake Asphalt is "Nature's everlasting waterproofer," and we use it to make Genasco.

Comes in rolls ready to lay. Mineral or smooth surface. Ask your dealer for Genasco. Write us for the Good Roof Guide Book and samples—free.

The Kant-leak Kleet, for smooth surface roofings, does away with cement in laps, and prevents nail-leaks.

GENASCO · THE STANDARD OF EXCELLENCE · TRADE MARK

THE BARBER ASPHALT PAVING COMPANY

Largest producers of asphalt, and Largest manufacturers of ready roofing in the world.

PHILADELPHIA

New York San Francisco Chicago

Let us send you a free sample of this most remarkable of all roofing materials—

Winthrop Asphalt Shingles

These shingles are made of solid asphalt into the exposed surface of which fine chipped slate is rolled under heavy pressure. The slate is carefully selected for its rich, natural coloring of red and green, giving the shingles a wonderfully rich, beautiful appearance.

Winthrop Asphalt Shingles

are extremely durable, easy to lay, light as wood shingles and as low in cost. They are fire resisting and absolutely weatherproof.

DON'T FAIL TO WRITE FOR YOUR SAMPLE

Winthrop Asphalt Shingle Company

10 Sixty-First St. ARGO, ILLINOIS

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT. BUILDER

shingles are, of course, incombustible and therefore serve to keep out a fire originating from sparks or cinders falling on the roof, as well as serving to retain a fire starting on the inside of a building. Metal shingles are very much lighter than even wood shingles, and require much lighter framing than for slate or tile.

Metal shingles can also be made in any desired pattern or design and this permits a certain amount of roof decoration not possible with some other roof coverings. The fact that they are locked together prevents the entrance of snow, rain or wind, thus further protecting the contents and increasing the comfort of those living under them.

The Milwaukee Corrugating Co., with offices in Kansas City, Mo., and Milwaukee, Wis., are making metal shingles bearing the trade mark "Titelock," this being the indication that they are unusually well designed to keep out the inclemencies of the most rigorous climate. In order to show contractors and others exactly how these shingles fit together, they are sending out small samples which show the patent locking device. These samples will be sent to interested contractors, builders, etc., provided THE NATIONAL BUILDER is mentioned.

RED CEDAR CHESTS.

The contractor and builder who is alive to the possibilities of his calling has frequent opportunities to suggest the interior fittings of the homes which he builds. He is appealed to for opinions regarding furniture, aside from the equipment built in, and his opinion on such articles as dining room tables and chairs to harmonize with the trim and woodwork, as well as other articles of furniture, is frequently sought. He should, therefore, be posted upon these matters as well as the price of nails and lumber.

The Chicago Millwork Supply Co., 611 S. Dearborn street, Chicago, Ill., are in a position to keep the contractor posted on a number of special pieces of furniture. Among those which they find of particular interest to the contractor is Tennessee Red Cedar chests. The use of chests of this character mean a considerable saving to the owner in clothing, as no moths or other insects will come near them when they are contained in a chest of the proper material or construction. A recent circular shows a number of stock sizes and styles in these excellent chests as well as a number of other articles. The contractor who wishes to be of the greatest use to his clients should send for this circular and also request the Chicago Millwork Supply Co. to keep him supplied with information regarding their numerous special bargains which they offer from time to time.

MODERN BATHROOM OUTFITS.

A contractor located in the smaller cities and towns is frequently at a loss to know how to provide suitable plumbing in the house which he erects. It frequently happens that there is no available stock of fixtures within reach and he has no way of showing his clients just what he would suggest in the way of installation.

A recent catalogue, gotten out by the Chicago House Wrecking Co., 35th and Iron streets, Chicago, Ill., shows in great detail a complete list of plumbing material and appliances. Besides being listed separately, there are a large number of combination outfits and it is hard to imagine any house which cannot be thus fitted out at a very reasonable expense with the highest grade materials.

The Chicago House Wrecking Co. is making special inducements to contractors at this time and it would seem wise to send for their complete illustrated catalogue.

THE UNIVERSAL LOCK MORTISER.

Time and labor saving tools and appliances are responsible for the rapid erection and completion of many of our large buildings. Among the appliances of value to the carpenter and contractor is the Universal Mortising Machine for door locks. This machine, as made by the Universal Mortiser Co., 3404 Alliquippa street, Pittsburg, Pa., will cut an opening of any desired size for mortised locks in hard, soft, cross grained or end wood in two or three minutes, according to the size of the mortise. When used for cutting for the facing of locks, no boring or chiseling is required, whether for straight or bevel face. Its construction and operation is so simple that the intelligent apprentice can do as quick and accurate work as the high-priced mechanic, and the ease with which it is operated makes it a favorite with those who use it. The Universal Mortiser Co. have circulars showing the operation of this appliance as well as samples of the work done with it. The contractor or carpenter fitting doors should investigate the merits of this appliance as the time and labor saved will pay for it on one or two jobs.

BUILT IN CABINETS.

The design of modern houses, especially bungalows and cottages requires that a certain amount of the furniture be built in place. This refers to cabinets, grilles, consoles, sideboards, bookcases, medicine cabinets, etc.

While this increases the cost of the house somewhat, the advantage of so doing gives much more available floor space and saves considerable investment for furniture.

Harty Bros. & Harty Co., 21st place and Loomis street, Chicago, Ill., have recently issued their catalogue No. 100 which shows in considerable detail a large number of designs of fixtures of the above character as well as their standard designs of doors, trim, moldings, ceiling beams, etc. This catalogue is of interest to the designer as well as to the contractor and carpenter. By the use of this catalogue, one is enabled to select the furniture for the various rooms and have them harmonize with the trim and other decorations. This catalogue is sent to our readers on request and is a valuable addition to anyone's library.

Real Files

E. C. SIMMONS KEEN KUTTER TRADE MARK REG. CUTLERY U.S. PAT. OFF. TOOLS

KEEN KUTTER
Carpenters' Special Slim Taper Files

guarantee 100% efficiency against 65% for ordinary makes. This statement is backed by the famous Simmons Guarantee—"Money back from your dealer if any Keen Kutter tool is not *all* claimed for it."

KEEN KUTTER

Carpenters' Special Slim Taper Files cut deep and cut true and cut quickly. Finely tempered and with teeth of even depth, these Files are guaranteed to give the longest service. If you value your saw and want it to give satisfaction, use Keen Kutter Carpenters' Special Slim Taper Files and no others.

"The Recollection of Quality Remains Long After the Price is Forgotten."

Trade Mark Registered. —E. C. SIMMONS.

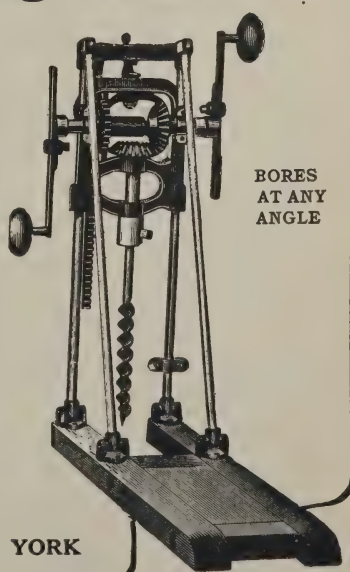
If not at your dealer's, write us.

SIMMONS HARDWARE COMPANY, Inc.
St. Louis and New York, U. S. A.

GUARANTEED AS TO WORK AND EFFICIENCY

Millers Falls Boring Machine

The boring crank is turned in one direction only, whether boring or drawing auger out of hole. Fully perfected. Bores at any desired angle, and is truly



BORES AT ANY ANGLE

THE WORKMAN'S FAVORITE

Adjustable Stop for depth of hole and quick reverse

Adjustable Cranks Regulate Speed and Power

Boring frame hangs itself up and is dropped to work by releasing thumb-latch. Regularly supplied to bore 11¼ inches deep, deeper if desired.

Fully described in catalog. As are many other Millers Falls Efficiency Tools. Send for FREE copies of catalog and our book "Tool Practice."

MILLERS FALLS CO.

28 Warren Street **NEW YORK**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Training Dogs and Otherwise

BY JACK DAHLTON.

The contractor gave his two best men a soft little puppy each, as he had promised. They would be nice for the kiddos to play with and that's about all they were worth, although he thought they had a good streak in them.

In the course of time both puppies grew up. They looked so much alike that nearly everyone got them mixed. But the sports about town knew the difference. Hadn't Ben spent hour after hour trying to coax or beat real knowledge into Spot's head. Ben had a pump gun he liked to tote around, and being the best shot in Liveburgh he was just crazy for the best dog.

Jake started in to training his puppy too, but soon gave it up. The darn pup simply wouldn't do as told, and, anyhow, Jake didn't care much about hunting, seeing the Indians and bears had retired long since.

So Jake's dog spent his time running after speeding autos, and not a dog in town could bark louder, not a dog in Liveburgh could be in so many different places at the same time. Once the authorities nearly put an end to him, thinking he didn't have a home. No one would have thought of offering more than $1.79 for Jake's dog.

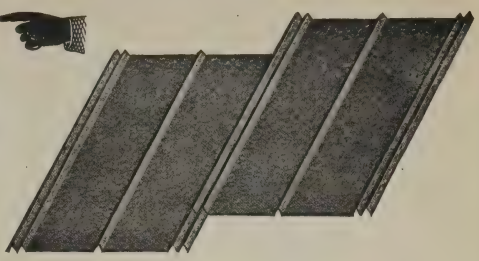
Jake simply wouldn't believe it when Ben told him he had turned down an offer of five tens for Spot. The idea of paying that much for a dog exactly like his was ridiculous. But that's what Ben did, and, furthermore, when the Banker found he could not get Spot, he did the next best thing, by inviting Ben and Spot to go along with him on all the swell hunting trips, and, of course, paying expenses.

That is how it came about that Ben and Spot had quite an acquaintance with the LEADING CITIZENS who liked hunting. That is how it came about that after a day's hunt certain LEADING CITIZENS, Ben and Spot gathered about a rough pine table in the hunting shack and listened to the city architect tell how many rooms the new hotel would have, how much it would cost, etc. The talk got around to the best contractor in Liveburgh for the job, and Ben's face flushed with pleasure when the Banker said he would like nothing better than to turn it over to Ben, but he knew, and Ben knew, he wasn't quite big enough for such a job—that they would have to have a contractor with the right kind of training for this work, for it was a big thing.

Ben told Mrs. Ben about it without seeing the bright light. The tired look in Mrs. Ben's eyes faded away, and Ben and Spot at once looked for cover.

"So you think that a compliment—so you thought I'd enjoy hearing

"Justright" Galvanized Roofing APTLY NAMED

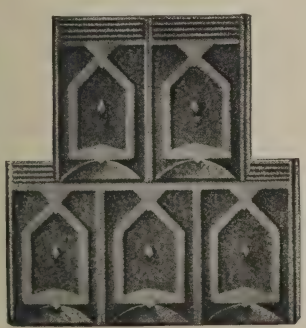


That Simple Roof That Don't Leak

¶ No Wood Strips Required. ¶ Adapted for Residences, Barns, Warehouses, Garages and buildings requiring fireproofing. ¶ Made in all lengths to meet requirements.

STANDARD Lock-Joint METAL SHINGLES

Are the **quickest laid** shingles made, Mr. Contractor and Builder, and they give absolute satisfaction and service. These are proven facts, and don't ignore them. ¶ Our metal shingles are made in either **Painted Tin or Galvanized.** They are twice as quickly applied as those of any other make. In using them you are saving time, and saving time means saving money. Can you afford **NOT** to investigate them? ¶ Our Standard Lock-Joint Metal Shingles have a continuous seal at end of side-lock. It is impossible for rain, snow or sleet to blow up under them. Ours is the only shingle made having this feature. And they lock—lock so that they will always keep in one, and only one position, contraction and expansion being provided.



Let us send you our general instruction roofing booklet. You'll find it very handy to have, and it explains all about our Standard Metal Shingles. Drop us a line about it. It's free. Further: We have an ATTRACTIVE PROPOSITION to make to Contractors and Builders in territory in which we are not represented. Write us regarding terms, etc.

The Moeschl-Edwards Corrugating Company

9th Street, Covington, Ky., (Opposite Cincinnati)

Sheet Metal Building Material, Interior & Exterior

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

about the big money you might make if you were only trained for big jobs—and after you began on that correspondence course in instructions and only sent in two lessons for correction—you didn't have time to train yourself, but I notice you had plenty of time to train Spot, even when you were so tired you could hardly walk. If you had spent one-half the time on that correspondence course and study those National Builders you subscribed for instead of training a dog, I wouldn't have to spend so much time here in the kitchen trying to dish up liver so you will think it's young turkey."

Shortly after that talk Ben began again on the correspondence course. He went carefully over his National Builder. He found the plans published each month helped him to get business. He found out that the advertising pages had great possibilities in them. He found it paid and paid well to have acquaintances among those advertisers. He laughed right out loud when Jake told him he had stopped his subscription—that the National Builder was too full of ads anyhow. He remembered the time when he thought the same thing about ads, but now, well, those ads were just like so much money to him in his business.

It wasn't any fun at first, studying after a hard day's work, but it wasn't any harder than training Spot, so Ben kept at it. He even took several special courses of instruction on certain kinds of construction work.

Of course, when Ben began cutting out the hunting trips, and loaning Spot to the Banker and the other financiers, they soon tumbled to what Ben was doing. Small but well paying jobs began, slowly at first, coming Ben's way, and one was finishing up in a new material he had read about in the National Builder. It made such a hit that all the neighbors talked about it, and, better yet, put the same improvements in their homes, Ben doing the work, so it would be sure to be right.

The hotel that Ben didn't get to build proved a financial success, so the Banker decided to put up one like it across the river, and this time he took a chance on Ben, seeing that he had become quite an authority among the other contractors on certain technical building questions and had the training and experience now for bigger things.

Jake's dog isn't worth anything at all now. Ben's dog Spot has a place in the history of Liveburgh among the sportsmen. Anyone of them would give Ben a hundred dollars for him, but Ben wouldn't sell at any price. It took Ben too many years to see the difference between being trained and untrained, experienced or otherwise.

Mrs. Ben's eyes don't look so tired nowadays. She's not trying to dish up liver into young turkey as she has the money right on hand for the latter any old time, but being a woman, she can't help but make remarks about the two or three years Ben wasted training Spot when he might have spent that time training himself and been rich that much quicker.

Amatite ROOFING

Mineral Surfaced— Needs No Painting

EVERYTHING about Amatite appeals to the man with common sense. He can see its superiority at once—the real mineral surface *which never needs painting*, the two layers of Pitch, which is the greatest waterproofing material known; the two layers of heavy Tarred Felt—all these contribute to the popularity of Amatite.

We can make Amatite better and cheaper than anyone else on account of our greater facilities, and consequently we sell it at a surprisingly low figure.

Simply the fact that it needs no painting is enough to make a man sit up and take notice—especially the man who has spent time and money in painting and repainting smooth surfaced roofings.

Write to-day for further information.

Barrett Manufacturing Company

New York Chicago Philadelphia Boston
St. Louis Cleveland Pittsburgh Cincinnati
Kansas City Minneapolis New Orleans
Seattle London, Eng.

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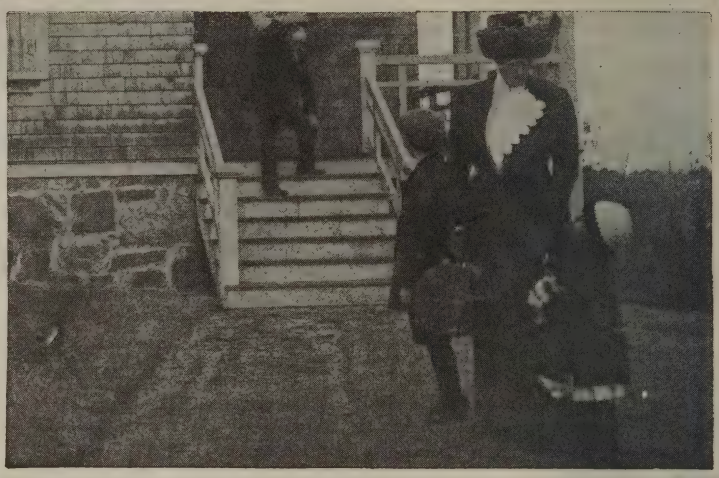
THE FORECLOSED MORTGAGE OR THE TRAVELERS



IF YOUR home is mortgaged, it must worry you at times to think what might happen if you should die and your wife and children were left without the means to pay the principal or even to meet the interest payments as they come due. How could your family prevent the loss of the home and the humiliation of being turned out under foreclosure?

End your worry and protect them by placing the responsibility on The Travelers by a Life Insurance Policy which at your death will pay off the mortgage and provide in addition a fund for purchasing the necessities of life. One of our Guaranteed Low Cost Life insurance policies for an amount proportionate to your means will do this, or a Monthly Income policy will meet the interest payments and provide each month a certain income for the family.

Send to **The Travelers Insurance Company, Hartford, Conn.,** for particulars. We will show you how to do it.

The Travelers Insurance Company, Hartford, Conn. TEAR OFF

Send particulars. My name, address and date of birth are written below.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

This cut shows the Holy Cross Church, Baltimore, Md. Entire interior fitted with Berger's Classik Steel Ceilings and side wall finishes

No Matter What the Building May Be—

school, church, office, or home, you will find in Berger's catalogue a ceiling particularly adapted to it. Among the dozens of ceilings and hundreds of combination designs there is a handsome ceiling to completely harmonize with any room you wish ceiled.

There is good money for you in the agency for

"BERGER'S Classik" METAL CEILINGS Ceilings

Write today to the nearest Berger branch for the large handsome catalogue

The Berger Mfg. Co.

CANTON, OHIO

For the best service address nearest branch.

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We also manufacture Ferro-Lithic and Multiplex Reinforcing Plates, Metal Lath, Roofing, Eaves Trough and Conductor Pipe and Sheet Metal Building Products of all kinds.

"A SAFE INVESTMENT"

PLACE YOUR ORDERS WITH

KRUS ENGRAVING COMPANY

MAKERS OF

HALF TONES - ZINC ETCHINGS
WOOD CUTS - DESIGNS
AND
MECHANICAL RETOUCHINGS

STROH BLDG. MILWAUKEE

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

GALVANIZED
100 3½ LBS
NEVERUST
GUARANTEE
WE GUARANTEE THESE NAILS TO BE HEAVILY COATED WITH PURE ZINK BY THE HOT PROCESS. AND NOT STUCK TOGETHER
WILCOX CRITTENDEN & CO MIDDLETOWN CT
CUT NAILS

YOU CAN'T MAKE 'EM RUST!

NEVERUST BRAND

Galvanized Nails

have for half a century held the lead with the marine trade of the continent. They are all that the name implies—Hot Dipped Galvanized—Smooth and Free from skin cutting edges. They cost no more than the shoddy kind. Insist on Hot Galvanizing.

The blame for defective work, Mr. Builder, is laid at your door. Your customer expected a Rust Proof Nail when he specified Galvanized. If your Nails rust there is bound to be complaint. The dealer may have been imposed upon or he may have deceived you. You can call him to account. But in the meantime you have a dissatisfied customer. You can avoid such difficulties by insisting on our **Neverust Brand Hot Galvanized Nails.** They outlast the material into which they are driven. *Write for Booklet.*

WILCOX, CRITTENDEN & CO., Inc.
Established 1847. **MIDDLETOWN, CONN.**

THE IMPROVED

"RED DEVIL" MITRE BOX $2.00

IS the only mitre box that will cut **any** angle with **any** saw, **any** place. Can be used **anywhere** in the shop or on the job. You want this "RED DEVIL" Mitre Box and no other. All good hardware dealers sell it. Just insist on the "RED DEVIL" Mitre Box and take no other. It's to your advantage to use it and do perfect work and save time. If you can't get it locally, send us $2.00 and your dealer's name, and one sample only will be sent you prepaid.

SMITH & HEMENWAY CO.
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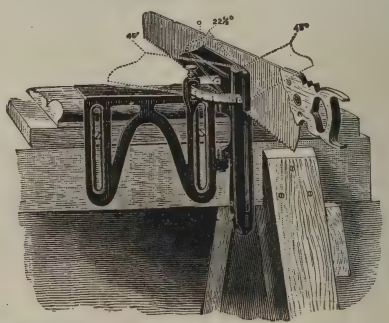
240 Lemoine St., - Montreal, Canada



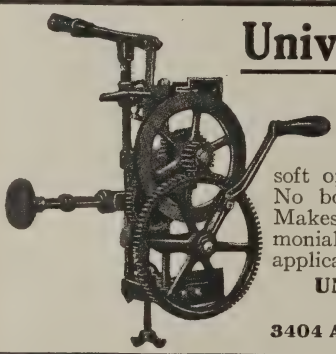
All Metal

Light in Weight

Practical in Every Detail

Folds up to Carry in Tool Box

Only Makers of Genuine "Red Devil" Tools. Over 3,000 Different Kinds and Sizes.



Universal Lock Mortiser

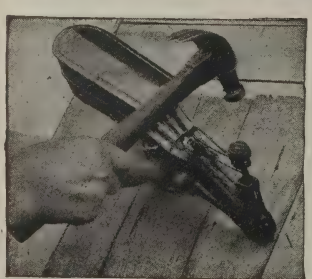
No builder should be without one.

Will cut lock mortises, **including setting in of face plate,** of any desired size, in hard, soft or crossgrained wood in from 3 to 6 minutes. No boring required. Every machine guaranteed. Makes a perfect job. Easily operated. Testimonials and descriptive booklets furnished on application to

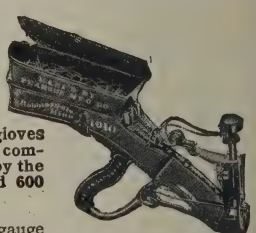
UNIVERSAL LOCK MORTISER CO.
Geo. O. Rogers, Sales Manager
3404 Alliquippa St. **Pittsburgh, Pa.**

Showing lock mortise cut, including face plate setting

PEARSON'S AUTOMATIC SHINGLE NAILER



Pays For Itself on One Fair-sized Shingling Job



Works well on roofs of any pitch. You can wear gloves or mittens and drive nails faster and with more comfort than the old way. Just throw the nails in by the handful (Nailer holds easily between 500 and 600 nails in the top), and start nailing.

PEARSON NAILERS are made in two sizes.

The Blue Nailer is for common 3d, No. 14 gauge wire nails, and the Red Nailer is for the **galvanized** 3d, No. 13, 1¼ in. wire nails. Order from your dealer or send **$5.00** for either one—express prepaid. Money cheerfully refunded if Nailer is not as represented. *Write for Circular "N"*

PEARSON MFG. CO. ROBBINSDALE, MINN.

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WHEN YOU GET TO **SASH CORD** use **SILVER LAKE**

and insist upon getting it from your dealer. To insure you against substitution, we stamp our name upon every foot of our cord. Carried by all dealers.

SILVER LAKE BRAIDED SASH CORD was originated by us, and for forty years has been recognized as **THE STANDARD**

Established 1869

Let Us Solve Your Hanger Problems!

No. 29
Richards Gem

We make a hanger for any door that slides.

Richards-Wilcox Trolley Hangers are the result of our thirty years of hanger making experience.

The shape of track, trucks, wheels and pendants shows our careful study of your customers' requirements. Don't experiment, get the goods with a backing—a knowledge behind their make.

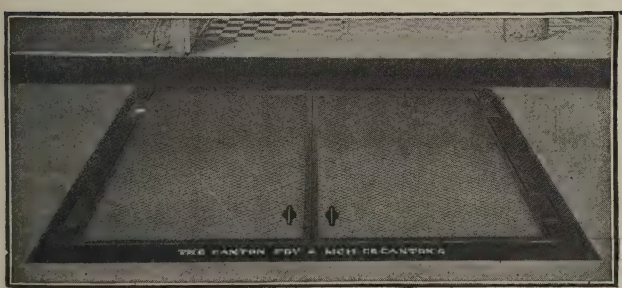
Sold by the Hardware Trade

RICHARDS-WILCOX R-W AURORA TRADE MARK

This trade mark should be your guide to placing hanger orders.

Have you catalogs?

Richards-Wilcox
MANUFACTURING CO.
AURORA, ILL. U.S.A.
Door Hangers and Hardware Specialties



Flush Sidewalk Doors

No hinges, handles or other parts projecting. One piece frame with water-drain. Checkered wrought steel leaves. Locks from either side. Made also in illuminated style. Fifty sizes of each.

Get our Booklet "B-5" describing our entire line of Builders' Supplies

The Canton Foundry and Machine Company, Canton, Ohio

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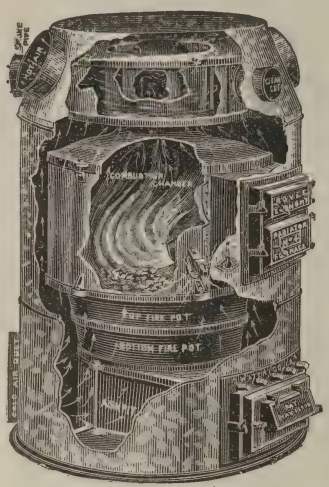
Bovee Furnaces at Manufacturer's Prices



Bovee's Economy Furnace.

Saves 50 per cent of Cost; 40 per cent of Fuel. Most Durable, most Economical Furnace Sold. Has a perfect ventilating system for every part of building.

RESIDENCE HEATING PLANT

Hot air registers in five rooms, cold air return in two rooms, 40 in. Furnace, 20 in. Fire Pot, 28 in. Combustion Chamber, 10,000 cubic ft. Heating Capacity.

Special Price, $65.00

CHURCH AND SCHOOL HEATING PLANT

One large hot air, two cold air registers, 54 in. Furnace, 32 in. Fire Pot, 40 in. Combustion Chamber, 40,000 cubic ft. Heating Capacity.

Special Price, $95.00

Horizontal Furnaces with large doors or larger furnaces and more piping at proportionately low prices.

Bovee's Horizontal Furnace.

SEND FLOOR PLANS FOR FREE ESTIMATE

Bovee Grinder and Furnace Works, 60 8th Street, Waterloo, Ia.

BUY FROM THE MAKER

¶ **We have made and sold thousands of steel furnaces in Chicago, and we have sold them everywhere, by mail, direct to contractors, builders, and house owners, all over the country, from Maine to China. We don't offer them through dealers, for the DIRECT DEAL with the consumer is the most satisfactory to all concerned. It means BETTER SERVICE—because of the direct interest of the maker in each contract—and it means BETTER PRICES, for the middlemen's profits are cut out.**

¶ **In buying** the Hess Furnace, **you needn't have faith.** You can buy it now, on trial, and test it before January 1st, 1913. We will deliver it at your station, with all pipes and registers—freight prepaid.

¶ **Set it up and use it.** If you're not pleased; not sure you have big value for the price—send it back to us—we paying return charges—and we won't claim one cent from you.

¶ **We don't offer you credit, however,** for we require the price to be deposited with your local banker when you receive the goods. He holds it till the test is made, subject to the conditions outlined above, and gives it to you or to us, according to the result of the test. You take no risk, and you will save money.

¶ **Our furnace is made of steel,** EVERY SEAM WELDED, and therefore permanently gas—dust—and smoke—tight. Made in six sizes, and burns any fuel. There is no furnace better, at any price.

¶ Our 48 page booklet on furnace heating is free. Ask for one. It will give you a lot of useful information on heating.

HESS WARMING AND VENTILATING CO.

907 TACOMA BUILDING, CHICAGO

WE MAKE THOSE BEAUTIFUL WHITE STEEL MEDICINE CABINETS; CHEAPER THAN WOOD

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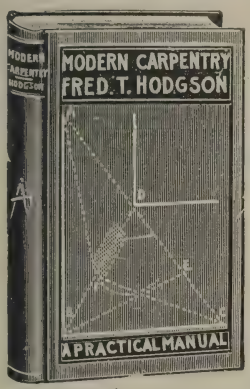
Modern Carpentry and Joinery

Vol I. By Fred T. Hodgson, F. A. I. C. 300 pages, 318 illustrations, 12mo, Cloth Binding.



This is a real modern work and the large numbers of it that have been sold (over one million) is an evidence that American workmen have found in it the things they expected. It is one of the best books of the kind ever brought out for teaching the young workman the art of correct and easy woodworking. It shows how to lay out roofs, rafters, stairs, hoppers, bevels of all kinds, mitering, coping, circle work, flooring, splayed work, plain stairs and handrailing, cornicing, dovetailing and many other things the young carpenter will require to know in the performance of his regular work. It is written in a very simple style, and can be understood by any person who can read every-day English. Unlike other works prepared for workmen, it is devoid of bewildering formulae and algebraic puzzles, and the reader is not asked to wade through long mathematical calculations to get at the kernel of the subject before him.

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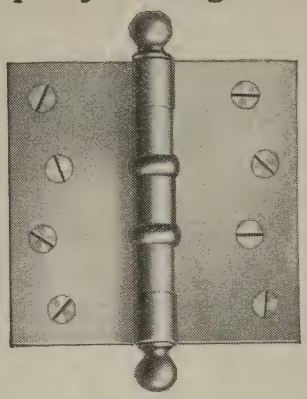

which will open softly and smoothly, without friction, can be obtained by using

STANLEY'S
Ball Bearing Hinges
with non-rising pins

Write for Circular "N." It tells the whole story.

THE STANLEY WORKS
NEW BRITAIN CONN.

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This volume contains some examples of work, with a description of the way the work is performed, and the materials employed. Many very difficult problems are here shown and the solutions and explanations are given and fully explained, many things that at first seem formidable to the unpracticed workman, become quite easy of solution under the magic wand of the author's method of explanation.

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Spend your vacation on the Great Lakes the most economical and enjoyable outing in America.

Daily service is operated between Detroit and Cleveland, Detroit and Buffalo; four trips weekly between Toledo, Detroit, Mackinac Island and way ports; daily service between Toledo, Cleveland and Put-in-Bay.

A Cleveland to Mackinac special steamer will be operated two trips weekly from June 15th to September 10th, stopping only at Detroit every trip and Goderich, Ont., every other trip.—**Special Day Trips Between Detroit and Cleveland, During July and August.—Railroad Tickets Available on Steamers.**

Send 2 cent stamp for Illustrated Pamphlet and Great Lakes Map.

Address: L. G. Lewis, G. P. A., Detroit, Mich.
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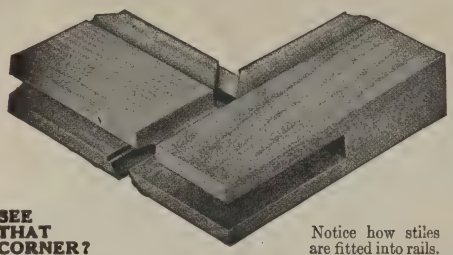

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Notice how stiles are fitted into rails.

MADE TO ORDER

Fly Screens and Screen Doors

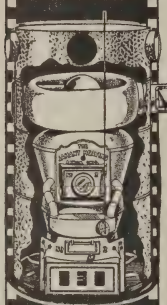
We use the best grades of wire, black enamel, galvanized, pearl and copper bronze, fastened by the improved **Standard Shoulder Strip Method,** which makes the wire drum tight and firm, can not sag or pull away.

Dealers, Carpenters, Contractors and Builders, write for a free copy of our 1912 illustrated catalog

STANDARD SCREEN CO., 1848-50 W. 14th Street **Chicago, Ill.**

Our screens are all mortised, tenoned, joined with waterproof glue and pinned with steel pins, will last a lifetime

Specify the Jahant DownDraft Furnace



Write for Terms and Free Furnace Handbook

OUR SERVICE DEPARTMENT

will cooperate with any Builder, Contractor or Architect who wishes to specify or install a dependable heating equipment. The **Jahant Down-Draft Furnace** solves the heating and ventilating problem for residences, schools, hotels, churches, and similar structures. Our 365 day "Guaranty Bond" given with every furnace insures absolute satisfaction. Send us details, sketches or blue prints of the building to be erected, and we will furnish without cost special plans, specifications and blue prints of a

JAHANT DOWN-DRAFT FURNACE

guaranteed to furnish plenty of heat at a minimum cost for fuel. If you include the Jahant in your finished plans we will pay freight on the complete shipment of furnace, pipes, registers, all fittings and the necessary tools.

Write for our free Specification Hand Book. It tells more about the Jahant and our co-operative plan.

THE JAHANT HEATING CO.
90 Mills St., AKRON, OHIO

Furnace Builders for over 30 Yrs.

MAJESTIC FOUNDATION COAL CHUTE

¶ Protects the building just where most needed—above the opening. ¶ The heavy steel hopper catches all the coal.

¶ When not in use, the hopper lies in the bottom of the chute body. ¶ The door locks automatically either open or closed. Strictly burglar-proof. ¶ With ¼ inch wire glass or steel panel in door.

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Hot Off the Press

Our trade bulletin No. 1 containing valuable information for the Architect, Woodworker and Builder. All the information you need regarding wood columns. This is free for the asking.

THEY CANNOT COME APART

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The Recessed Steel Medicine Cabinet

MEDICINE
HESS SANITARY LOCKER
CABINET

The Only Modern, Sanitary, STEEL Medicine Cabinet

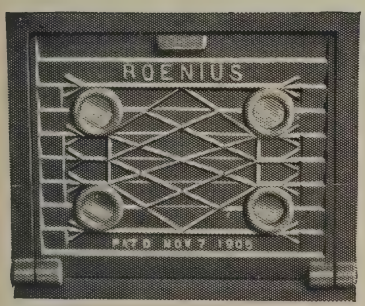
or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves. Costs Less Than Wood.

Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned. Should Be in Every Bath Room. Four styles—four sizes. To recess in wall or to hang outside. Send for illustrated circular.

HESS, 907 L Tacoma Bldg., CHICAGO

Makers of Steel Furnaces. *Free Booklet.*

The Outside Steel Cabinet

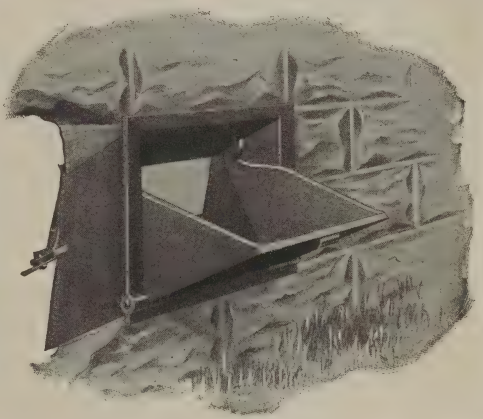


Roenius Wood and Coal CHUTES

Have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed.

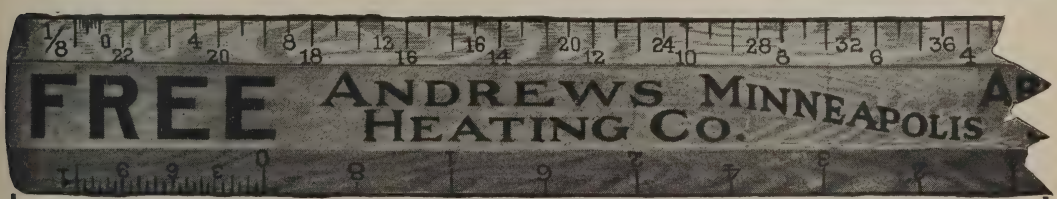
Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked.

Roenius style B Chutes are made with glass discs—and this chute is used especially in cases where the only available light must pass through the coal chute.



Ask your dealer for the Roenius—and get the best.
Write for Circulars and Prices.

GRAND RAPIDS FOUNDRY COMPANY
MANUFACTURERS
Grand Rapids, WISCONSIN



Architect's Scale SEND US TWO OR MORE NAMES of persons who are interested in or want to buy Hot Water Heating Plants and we will send you this scale. Back inches are divided into 6, 10, 12, 16, 20 and 40 parts. Also free catalog on request. Name this paper when writing.

ANDREWS HEATING CO., 1287 HEATING BUILDING MINNEAPOLIS, MINN.

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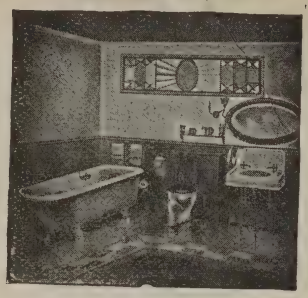

Full Line of Plumbing Supplies

Sold Direct at Wholesale Prices

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Complete bathroom outfits—tubs, closets, lavatories, kitchen sinks, etc. Prompt shipment from a complete stock. The only house selling up-to-date, guaranteed goods at wholesale direct. Write for illustrated catalogue and prices.

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Prompt shipments and materials all first-class.

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The Huber Builders Material Co.
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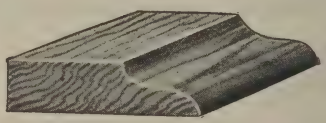

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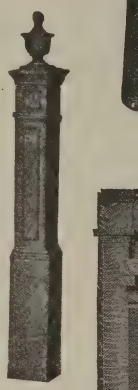
Best Yellow Pine
27c per 100 lineal feet



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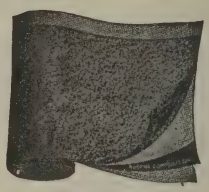

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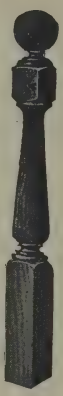

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Increases the Renting and Selling Values and Attracts a Better Class of Tenants

Builders and **owners** will find it a clinching argument to say, "It's floored with OAK FLOORING." It imparts an air of **refinement** and **elegance. It is the modern flooring.** OAK FLOORING ⅜″ thickness by 1½″ or 2″ face can be laid **over old floors** in old homes or over cheap sub-floors in new homes **at a very low cost.** it is **cheaper than carpets** or **pine flooring.** When laid it has all the appearance of heavy flooring.

There is a **solid satisfaction** and **lasting pleasure** in the **substantial** and **dignified appearance** of OAK FLOORING.

Contractors and carpenters find it very profitable to lay ⅜″ stock over old floors in old homes during dull periods. A little **canvassing** is all that is necessary to **secure** jobs.

For **durability** OAK is the **best.** OAK FLOORING laid thirty years ago, after very hard use, is still in good condition. ¶ **WRITE FOR CATALOG.**

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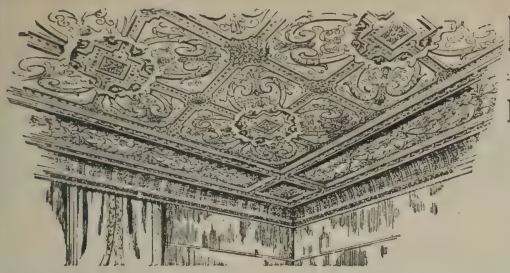

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For the Kitchen and Bathroom
Carpenters Can Apply It

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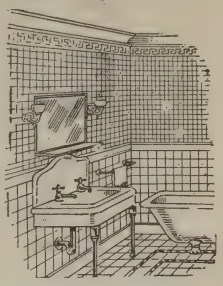
Patterns especially adapted for residence work. Nothing better for a new house, or to repair an old one. Catalog.



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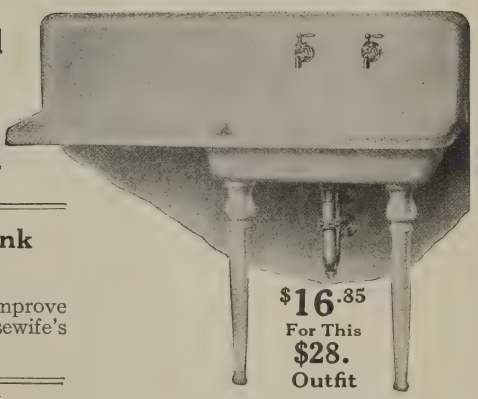


Take this Long Back One Piece Sink for example

Why not order one for your own home—it will improve the looks of any kitchen—it will make the housewife's work easier—everyone likes this sink.

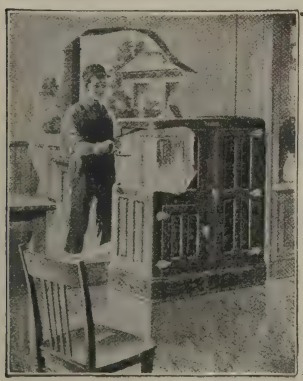
Write for Free Catalog

which shows a splendid line of modern Bathroom Outfits, from $38.95 to $175.00, Water Pressure Systems, Hot Water and Steam Plants, and an endless assortment of pipe, valves, fittings, etc. Everything high class and strictly guaranteed.

JOHN HARDIN CO.
Doing Business for 25 Years at the Same Old Address and in the Same Square Old Way of Treating Our Customers
4541-4549 COTTAGE GROVE AVE. CHICAGO, ILL.

This is a new designed Porcelain Enameled Roll Rimmed Sink, having Back and Drain Board all in one piece—Wall Hanger, Adjustable Legs, Concealed Galvanized Air Chambers, Nickel-plated Strainer, Fuller Adjustable Flanged Bibbs and "P" Trap, with waste to wall. Sink is 20 x 30 inches, with 20 x 24 inch counter, sink drain brass; 12 inch back extending over sink, and runboard all in one piece.

This low price of $16.85 includes two $1.50 Faucets, and the large 1½ inch Trap. Better send in your order now—while we have these sinks in stock.



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You can secure a great service for your clients and employees by specifying our latest improved refrigerator, the system of which is the result of 20 years of experience and public test.

Finest residence styles—built in fancy woods.
White Odorless Spruce, White Enamel and Opal Glass Linings.

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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Quicker than a Monkey Wrench

Surer than a Claw Hammer

More Powerful than any other Pliers

Starrett Expansion Pliers

—the handiest tool for Shop or Home
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42-17 **The L. S. Starrett Co.**
Athol, Mass.

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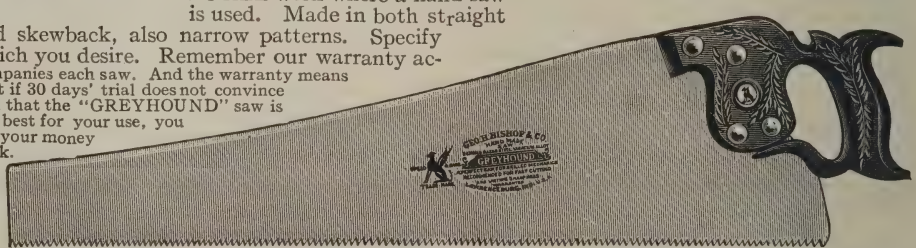
The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. ***This saw will be imitated by others—but not equalled.***

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the best for your use, you get your money back.



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GEO. H. BISHOP & CO., Makers, Lawrenceburg, Indiana

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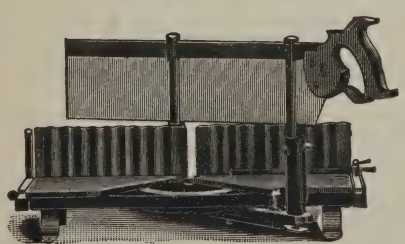

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First in Quality and Improvements

Automatic stops for holding up saw. Corrugated Backs. Graduated. Gauge for duplicate cuts and many other features. If you want the best you will take no other.

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READ HIS LETTER; SEE THE HOUSE HE BUILT AND CONSIDER THE SAVING HE MADE

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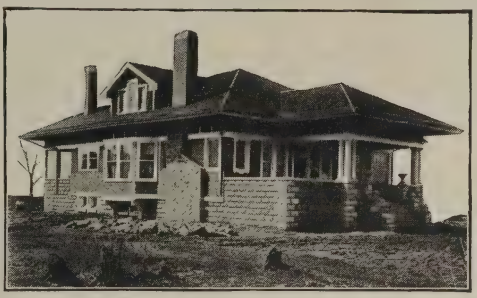

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Gentlemen:—We are in our new house or bungalow as we prefer to call it, and we are greatly pleased with everything. We feel that you have saved us $1,500.00 on our materials, and you have given us every courtesy that a seller can give a buyer.

Very respectfully, AUGUST M. SCHILLER.

No Matter Where You Live We Can Save You Money On All Building Material.

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In every state in the Union Sears, Roebuck and Co.'s building materials have been used with the most satisfactory results. The purchasers have written enough letters of approval to fill a book which has been published under the title of "Successful Building," and which is free for the asking. Below is a sample of letters recently received. **What do you think about it?**

READ WHAT THIS INDIANA CONTRACTOR SAYS.

Evansville, Ind.

Sears, Roebuck and Co., Chicago, Ill.

Gentlemen:—I have been in the contracting business for a number of years. Not only have I put up many small houses, but a great many of the best residences in this city.

I am free to admit that the materials you furnished were in my judgment, way above the average, in fact, it is very seldom, if ever, we can secure stock in our local markets as good as what you furnished.

Everything came on time and in good shape. We were not delayed in any way by reason of the goods not being here.

This is my first experience in building houses where the material was secured from a concern such as yours, and I will add that I was more than pleased, not only with the goods, but the way in which they came.

Yours very truly, ALFRED F. BORNEFELD.

MAIL COUPON TO US AT ONCE, TODAY, AND GET THESE TWO BIG BOOKS FREE

They Tell the Whole Story.

CLIP THIS COUPON—MAIL IT TODAY

Sears, Roebuck and Co., Chicago, Ill.

Please mail me free and postpaid your Book of Modern Homes, Building Material and Mill Work Catalog and a Wholesale Lumber Price List, as per announcement in *the National Builder*

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Postoffice _____

Local Address _____

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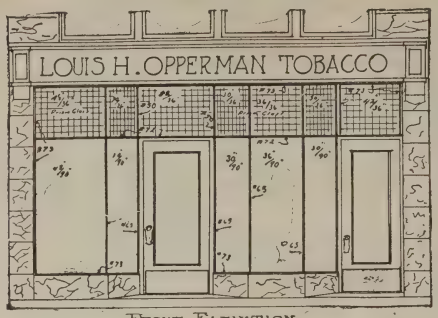

FRONT ELEVATION.

There's Nothing Cheap About Petz Bars

To cheapen them would mean that they would be less strong, less safe for you to use, less perfect in the details that you demand in the important work of planning a modern store front.

Architects and builders who value their reputation specify **Petz Bars,** because they never fail to back up their known qualities of strength, safety and beauty.

Easy to install and satisfactory to the owner.

You will find many valuable suggestions in our booklet on "Metal Store Front Suggestions." Write for a copy today.

DETROIT SHOW CASE CO., Sole Makers
481 FORT ST. WEST, DETROIT, MICH.

Stable Ventilation

PROPER VENTILATION is a mighty essential part of stable design. If you are interested in a ventilator that is made of the very best galvanized steel and that offers greater ventilating capacity than the old fashioned wooden ventilator, ask your *dealer* to show you one or write for circular that gives prices and full particulars of the AURORA CUPOLA-VENTILATORS.

MESSENGER & PARKS MFG. CO., Aurora, Illinois

ORNAMENTAL CONCRETE WITHOUT MOLDS

By A. A. Houghton. 12mo; cloth: 128 pages. With original illustrations.

The process of making ornamental concrete without molds has long been held as a secret. It is now given to the public for the first time in this practical treatise.

This is the only work issued which explains a simple practical method whereby the concrete worker is enabled, by employing wood and metal templates of different designs, to mold or model in concrete any Cornice, Archivolt, Column, Pedestal, Base, Cap, Urn or Pier in a monolithic form—right upon the job. These may be modeled in units or blocks and then built up to suit the specifications demanded.

The fluting of columns is arranged by an easy method; any style or form of concrete Arch can be easily molded by this system.

Detailed instructions are given for molding any style of Concrete Monument as well as placing inscriptions on same, how to mold several styles of Urns and Lawn Vases with Pedestals, Ornamental Hitching Posts and Grave Markers, Fountains, Caps, Garden Chairs and Benches, Balusters, Lavoratories, Jardinieres, Flower Pots and many other forms of ornamental concrete.

The reinforcement of work is treated with illustrations and instructions showing how to make and place same.

Complete details are given of a simple machine, that anyone can easily build, to mold ornamental concrete by this system more rapidly and easily than it is possible with the usual old style molds in use for this work today. Price, postpaid.....$2.00

HODGSON BOOK COMPANY 539 S. Dearborn St. Chicago, Ill.

TWO MINUTE LOCK MORTISER

Not an experiment but a practical labor and time saving tool.

Thousands of builders have verified our claims. No lost motion, but every stroke of the lever counts. We don't want your money unless it does the work.

Riverside, Calif. A. W. MILLER MFG. CO. Cincinnati, O.

Our Butt Mortiser and Rule Gauge for 75 cents.

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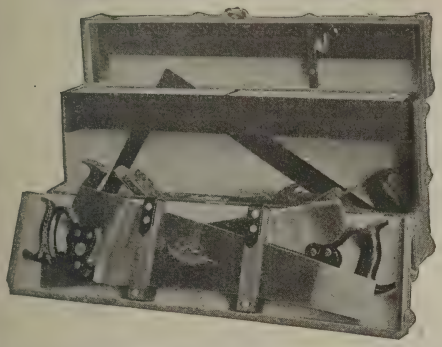
Don't Lug a Heavy Tool Box Around But

CARRY YOUR TOOLS IN THE INDESTRUCTO

CARPENTERS' TOOL CASE



It is made in suitcase style—of three-ply veneer, covered with strong canvas and painted, all edges bound in steel, reinforced corners, secure locks and catches and strong handle. The Indestructo is the handsomest tool case manufactured. It is light, very strong, and the inside is so well arranged with separate compartments for saws, planes, level, square, chisels, bits, etc., that the cutting edges cannot be injured. Tools can be quickly found and put away. It is made in two lengths, for 26 and 28 inch saws. Special sizes to order. Send for prices.

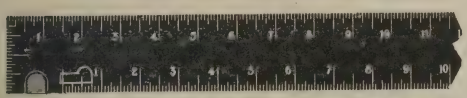
WEDELL & BOERS

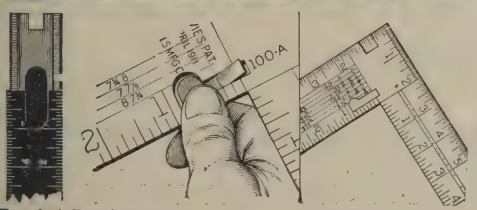
Sole Manufacturers

157 Jefferson Ave, Detroit, Mich.

Nicholls Take-Down Square—

It has a Thumb Lock. No Key to Lose.
GUARANTEED TO REMAIN TRUE





Beveled Bearings take up wear in taking square apart and putting it together, therefore it will remain true. Rust-proof canvas case with each square.
If your dealer does not handle our goods and will not order them for you, write us. We have a special inducement to those who order first square in every town. We prepay express.

THE No. 100A HAS THE OCTAGON FRAMING RULE ON BACK

	Polish	Ox. Copper	N. Plated on Copper
No. 3 Standard	$2.50	$2.75	$3.00
No. 100 Standard	2.75	3.00	3.25
No. 100R Framing	3.00	3.25	3.50
No. 100A Framing	3.25	3.50	3.75

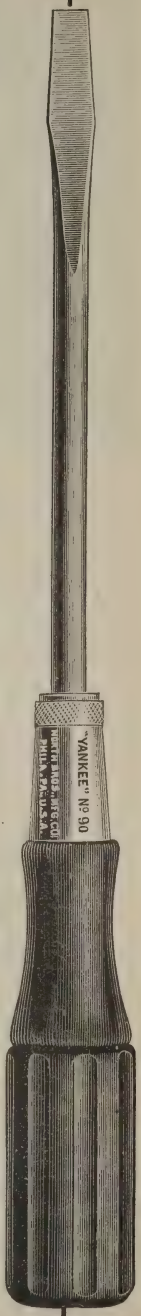
Add ten cents to the price of the No. 100R and 100A if 1¾ inch tongue is desired.

NICHOLLS MFG. CO., Ottumwa, Iowa

Another New "Yankee" Rigid Driver No. 90

14 Sizes

A strong, durable, and well-balanced tool, of the same high quality as other "Yankee" Tools, which today are without equal. The blade and ferrule are highly polished, the handle of hardwood, finished in dull black, making a handsome appearance. Each tool is thoroughly tested, and the blades are positively guaranteed not to turn in handle.



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North Bros. Mfg. Co.

Dept. N

Philadelphia, Pa.

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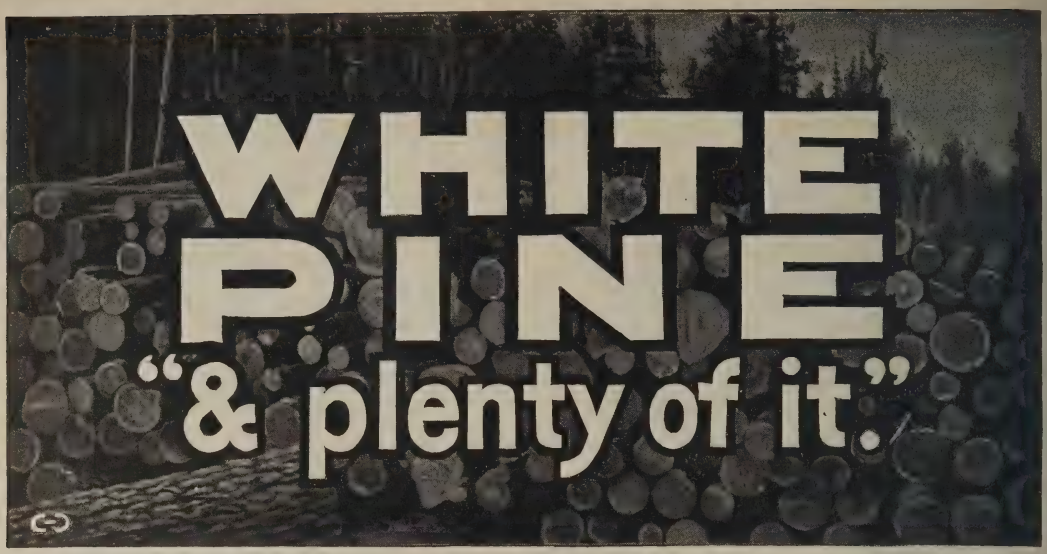

It Doesn't Require "Book Knowledge"

for *a good carpenter* to know the values of WHITE (and Norway) PINE as compared with other woods. He knows by cold experience the *easy working qualities* of WHITE PINE and the excellent appearing jobs he secures from its use.

There are, however, a lot of people who think they can get "all wool" results from cotton.

They are the kind of persons who ignore the Carpenter's advice when he recommends WHITE (and Norway) PINE.

Such people have to be educated. And good carpenters are telling them individually the same facts we are telling them with printer's ink, viz: that *SUPERIOR RESULTS* can only be obtained by the use of *SUPERIOR MATERIAL* and that—

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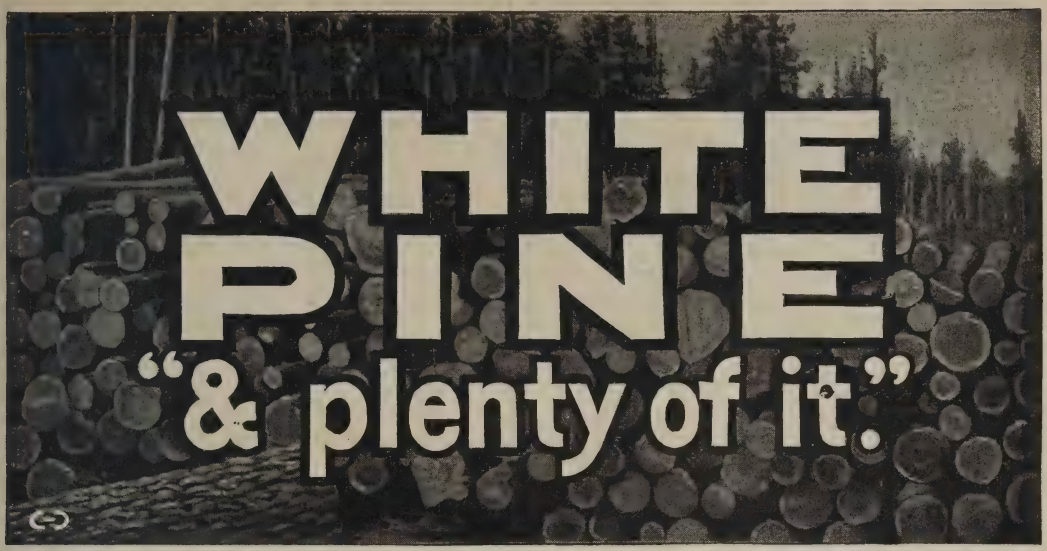

there is *NO LUMBER SO UNIVERSALLY DEPENDABLE* as good

WHITE PINE

"The Wood America is mostly built of"

and that there is PLENTY OF WHITE (and Norway) PINE, at reasonable prices, with prompt deliveries assured.

Buy your White and Norway Pine at your Local Yards

(We do not sell it as an association)

NORTHERN PINE MANUFACTURERS ASS'N.

1118 Lumber Exchange - Minneapolis, Minn.

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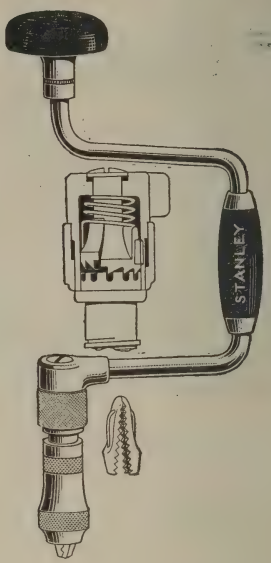
DUMB WAITERS

Some builders buy a Dumb Waiter Outfit and then build the enclosure to fit it. Others build the enclosure and then build or buy the Dumb Waiter to fit the enclosure.

The Sedgwick Machine Works carry in stock catalogue sizes of Dumb Waiter and Hand Power Elevator Outfits for prompt shipment (within twenty-four hours of receiving order) and make up promptly special sizes when stock sizes cannot be used. They sell complete outfits or any dumb waiter material wanted and every builder should keep their catalogue for ready reference, as it contains much valuable information resulting from their fifty years' experience as specialists in Dumb Waiters and Hand Power Elevators. Catalogue "K" sent free on request to Sedgwick Machine Works, 130 Liberty Street, New York.

Stanley Tools



Concealed Ratchet Bit Braces

The Cam Ring which governs the ratchet is in line with the Bit —a great advantage in working.

Note the Ratchet Mechanism

The two-piece Clutch is drop forged, machined and hardened.

When used as a Ratchet, five teeth are in engagement at one time—when used as a plain or non-ratchet Brace, **ten** teeth are engaged—in both cases insuring, even in the longer sweeps, a much stronger lock than is possible in any other form of Brace.

The Ratchet parts are entirely enclosed, keeping out moisture and dirt, retaining lubrication, and protecting the user's hands.

They have Cocobolo Heads and Handles, Ball-bearing Heads and all exposed parts are heavily nickel plated and highly polished.

FOR SALE BY ALL HARDWARE DEALERS

Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.

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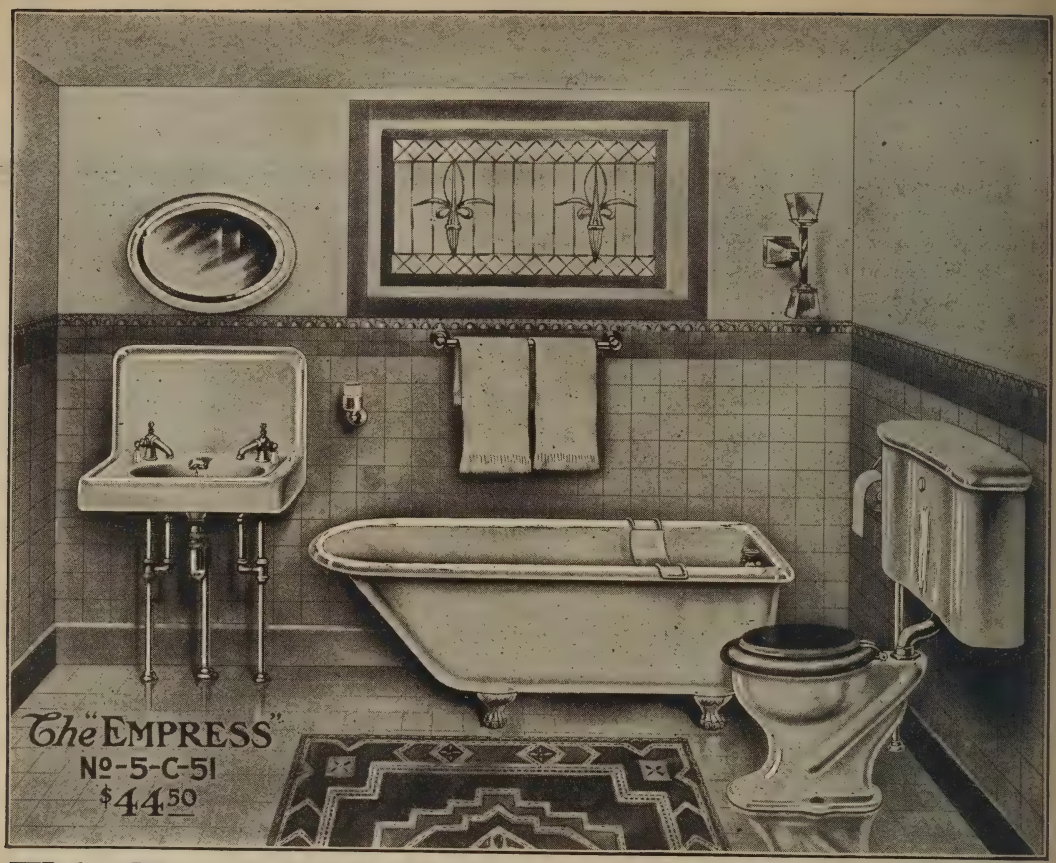

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THIS IS OUR CHALLENGE BATHROOM OUTFIT

Guaranteed strictly first-class in every particular.

This illustrates one of the ten different Handsome Bathroom Outfits carried in stock at our mammoth Chicago Warehouse and Salesrooms. A complete stock of everything needed to install Plumbing material from the cheapest to the very finest outfits.

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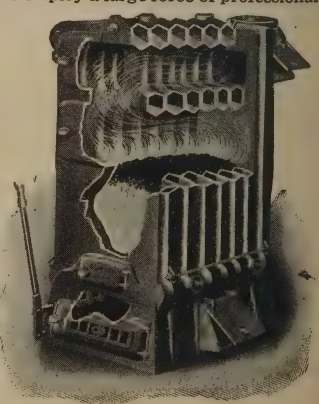

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The Disston Brand SAWS, TOOLS and FILES, by their efficiency and lasting qualities, soon repay their cost and become profit earners.

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NAT. BUILDER

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THE FINEST and most complete booklet that we know how to make on the finest hardwood flooring that **anybody** can make, is now ready for distribution. Your name on a post-card will bring you a copy free of charge.

"Steel Polished Perfection" Hardwood Flooring (Maple, Beech Birch & Oak)

is, beyond all question, the **best looking** and **best wearing** flooring produced in America. It always matches easily and accurately. It is easier to lay than any other brand of hardwood flooring. And when laid it presents **a beautiful, richly-polished surface**—an almost faultlessly smooth finish—made possible by the wonderful precision of fit for which Schroeder flooring is famous. **And best of all—**

Schroeder Flooring Positively Will Not Shrink

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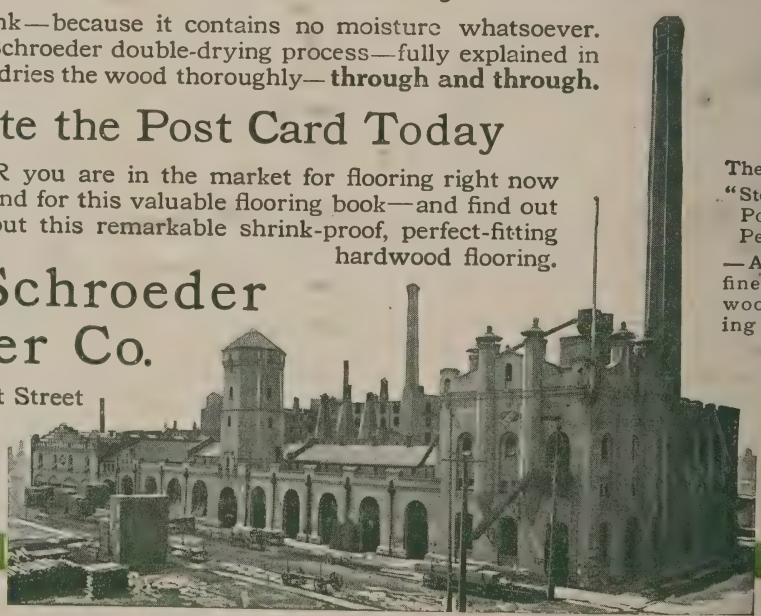
WHETHER you are in the market for flooring right now or not, send for this valuable flooring book—and find out all the facts about this remarkable shrink-proof, perfect-fitting hardwood flooring.

John Schroeder Lumber Co.

Foot of Pleasant Street
Milwaukee



The home of "Steel-Polished Perfection"—America's finest hardwood flooring factory.

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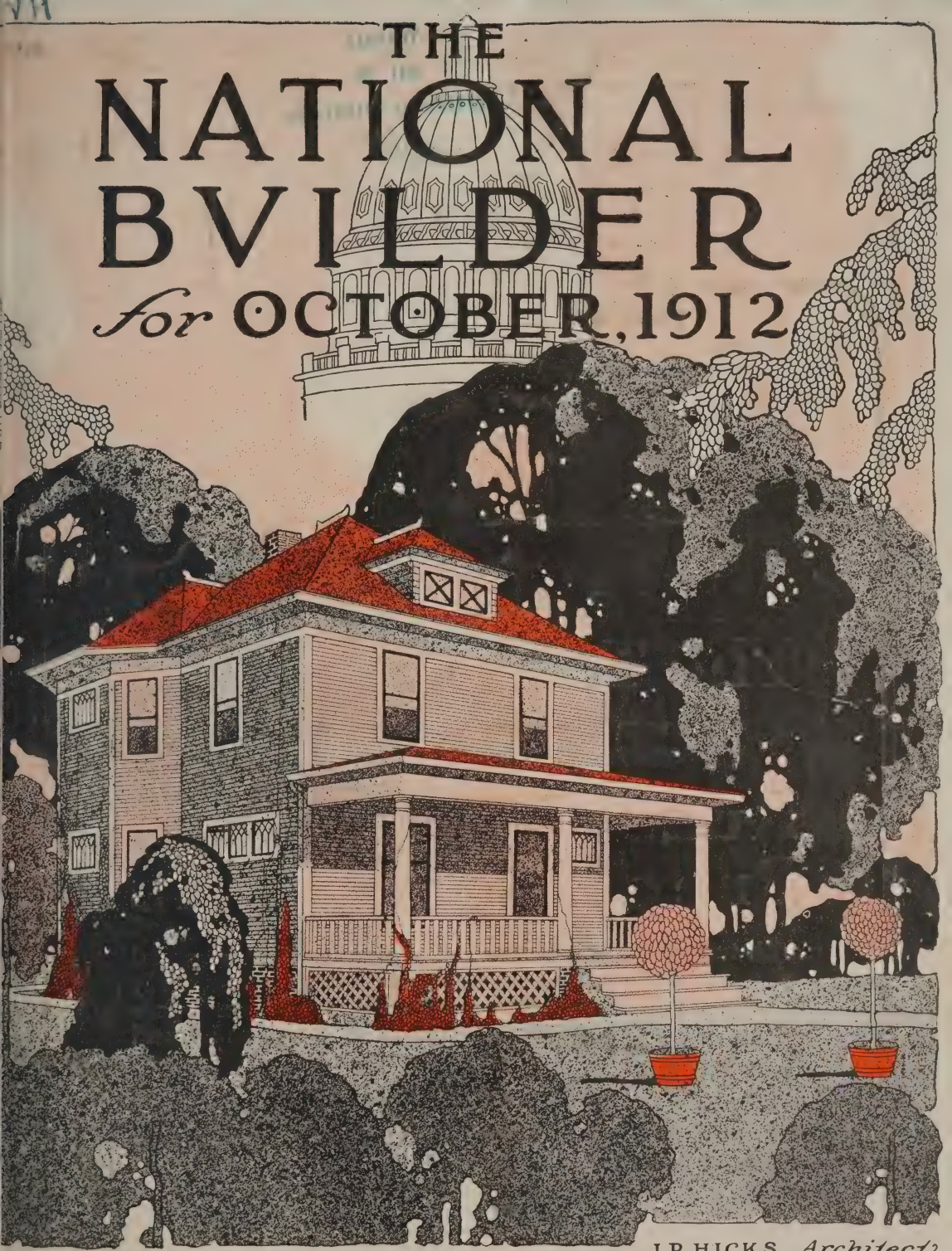

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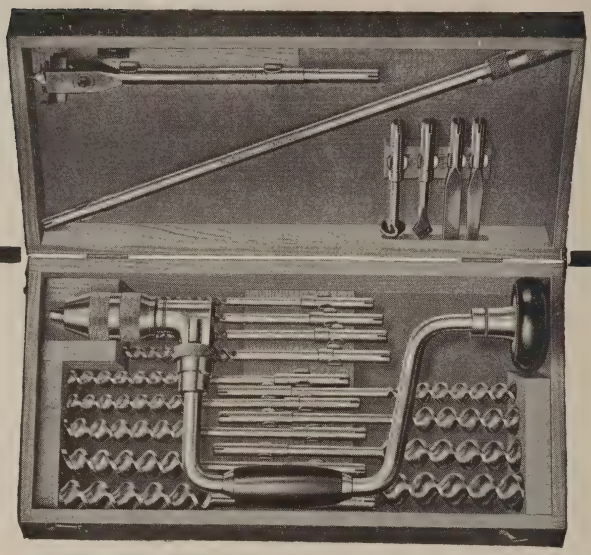

A Man Is Known By The Tools He Uses

If he can take pride in his tools, his *work* is generally worth taking pride in. The new

Russell Jennings Precision Tools

with turned shanks, are tools that any man will be proud of, and the results he can produce with them will certainly please him. These tools are the well-known Russell Jennings bits, with the correct double twist, extension lip, and screw point, and *with the new turned shank.* Other Precision tools are a new solid head expansive bit, with a cutter that can't creep, a bit extension that stays in line and can't pull out of the brace chuck, and screwdrivers, countersinks, etc.

Sold separately or in sets at any hardware store.

RUSSELL JENNINGS MFG. CO.
CHESTER, CONN.

21-83

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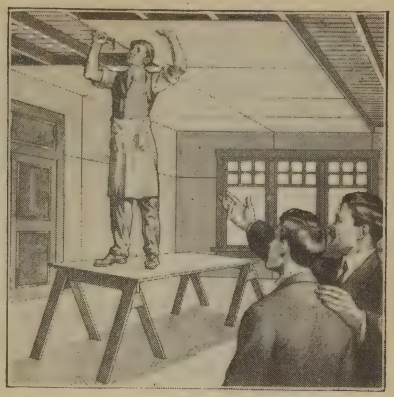
Get Better Interiors

Save Half Plastering Cost

And a Month on Your Building Job

BISHOPRIC Wall Board is rapidly superseding the old slow and costly lath-and-plaster construction for walls and ceilings. This wonderful material is adapted for use in fine homes, country clubs, bungalows, schools, churches, hospitals, stores and garages. It is weather-proof and fire-resisting. Is applied dry, and is ready at once for paint, paper, kalsomine, burlap or any other decoration. Stays rigid. Lasts as long as building. The only wall board made reinforced with lath.



Applying Bishopric Wall Board

For New Buildings or Remodeling

With Bishopric Wall Board it is a quick, clean, easy and inexpensive matter to partition off a room, or make waste space in attic or basement into usable rooms. It is the ideal material for all kinds of interior remodeling. Apply dry. No dampness. No dirt. Nail it to studding, and it is ready for decoration. Anyone who can drive nails can apply it.

BISHOPRIC WALL BOARD AND SHEATHING

Costs 50 Per Cent Less Than Lath and Plaster

Bishopric Wall Board is made of kiln-dried dressed lath imbedded under terrific pressure in asphalt-mastic, pressed with a smooth surface of heavy, sized fibre-board. Mastic-asphalt is tough and non-burnable. The lath make it non-warping and rigid. Will not warp, sag or pull loose. Steam from kitchen or laundry will not hurt it. Is sound-proof, moisture-proof, rat-proof. Keeps out cold in winter and reduces fuel bills.

$5,000 Anti-Warp Bond

Bishopric Wall Board will not warp, buckle, crack or pull loose in any climate, winter or summer. This claim is back by a $5,000 Anti-Warp bond. Every purchaser is protected by this bond. Comes in sheets 4 feet square, ready for use. Sheets meet evenly at edges. Prices: $2.50 for 100 square feet; $6.40 per crate of 16 sheets, 256 square feet.

Room finished with Bishopric Wall Board

Write for Bishopric Book, Sample and Model House Plan.

Big illustrated book will give you dozens of ideas for better interior decorations. Book, big sample of wall board, complete set of blue print plans for model house, copy of $5,000 Anti-Warp bond, letters from users — all free. Shows how builders, carpenters and contractors can increase their profits. Enclose 6 cents in stamps for packing and mailing.

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Write for Great Exclusive Agency Proposition

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The "ABC" of Beaver Board Construction

The tenth of a series of twelve monthly talks to carpenters about the practical use of Beaver Board, the pure-wood-fibre wall and ceiling material that is durable, economical, artistic; has none of the disadvantages of lath, plaster and wall-paper; and is appropriate to any type of building new or old.*

Beaver Board is essentially a proposition for Carpenters and Builders.

CHAPTER X

Beaver Board in Panel Treatment

YOU carpenters have noted the ever-increasing use of the panel in all types of architecture—in the home, the store, the club—wherever a harmonious and naturally artistic effect is desired.

Panel-treatment lends itself with unequalled facility to a marvelous variety of design and color. Its very nature admits of flexibility of treatment. Architects, appreciating the endless possibilities of the panel, are using it more and more, where unique and distinctive decorative effects are sought for.

With a panel assuming such an important part in the tendency of modern design, it is exceedingly important that you be familiar with the possibilities of Beaver Board in panel design, for Beaver Board is a money-making proposition for the carpenter who knows its possibilities.

*These chapters began in the January number. If you missed back chapters, write us—we'll mail them to you.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Beaver Board Panel Possibilities

Every kind of design is possible with Beaver Board. Put up in a number of sizes, its application is speedy and economical. The use of dado, frieze and wainscoting is optional. Beautiful and artistic results are obtainable either way.

Great success also attends the use of Beaver Board between ceiling joists, with false beams or battens bringing out the panel effect.

The cream-colored pebbled surface of Beaver Board offers the ideal surface for the application of the popular, soft, restful tints. These color schemes are limited only by the originality of the builder. Panels and decorative strips may match the furniture in dull oak, mission, antique, etc., or soft greens, reds and the like, lend warmth, especially when set off by contrasting oak or cream-white battens.

Before applying the paint, Beaver Board should first be sized with a varnish size, slightly thinned. Paint the Beaver Board before fastening the battens. Two coats of any good lead-and-oil paint, or any standard manufactured paint, make a finished bit of work that graces either the mansion or the cottage—and inexpensively, too.

Our Designing Department — service absolutely free—is ready to make detailed suggestions as to design, application, etc. To avail yourself of this department puts you under no obligation whatever, and enables you to give your clients the ideas and suggestions of experts. This service is for *you*—profit by it.

While the possibilities opening before you are fresh in your mind, send for "Beaver Board and Its Uses," and let us show you why the carpenter who knows Beaver Board is always busy.

BEAVER BOARD

Pure-Wood-Fibre Walls and Ceilings

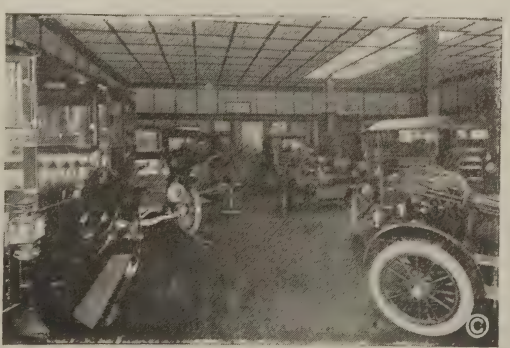
BEAVER BOARD PURE WOOD FIBRE

TRADE MARK

GENUINE BEAVER BOARD has our registered trade-mark on the back of each panel and sample. It has also a light-cream color all the way through, that comes only by the use of sanitary, durable **PURE-WOOD-FIBRE.** Insist on seeing both trade-mark and color before buying.

Illustrating the interior of the bungalow of Mr. P. R. Friedel, Memphis, Tenn. Note the attractive and artistically paneled walls.

A Beaver Board reading-room in the Motor-Boat Club of Buffalo.



Effective Beaver Board panel-treatment of a salesroom of the Maxwell & Briscoe Co., Buffalo, N. Y.

The BEAVER COMPANIES

Address all Correspondence

United States: 452 Beaver Road, Buffalo, N. Y. Canada: 392 Wall St., Beaverdale, Ottawa.
Great Britain: 4 Southampton Row, Russell Square, London.

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ROCK BOARD FOR WALLS AND CEILINGS

"ROCK" stands for firmness and durability.

ROCK BOARD FOR WALLS AND CEILINGS

In using ROCK WALL BOARD you are getting a material of *quality* and *durability*. It has a splendid surface for decorating and can be finished in any artistic manner. Possibly you have an attic or a room you would like partitioned off—this is the best material for the purpose.

ROCK WALL BOARD is the modern material for remodeling or partitioning every room in any kind of building. It is easily applied, sanitary and economical.

ROCK BOARD is made in panels 32 and 48 inches wide by 6, 7, 8, 9 and 10 feet long.

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WALL BOARD THAT DOES NOT WARP

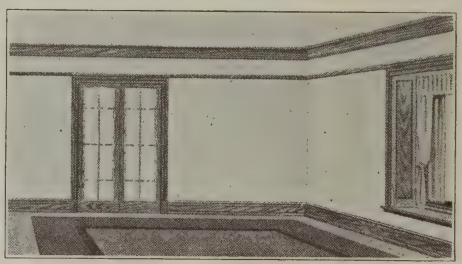
FIRE PROOF

NOT MADE OF WOOD, PULP OR PAPER

THE ONLY SATISFACTORY WALL BOARD

FOR THE ENTIRE HOUSE

Bestwall



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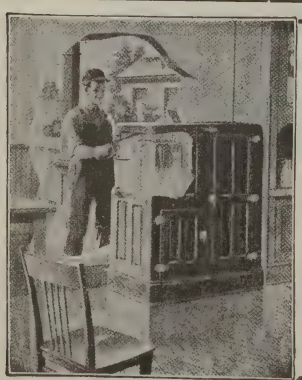

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White Odorless Spruce, White Enamel and Opal Glass Linings.

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WATERLOO, IOWA

NAT BUILDER

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Wall Board
Painted with
DULLKOTE

A wall board interior, with Dull Kote, is sanitary, artistic and lasting, and can be washed with a sponge like tile. It permits of tasteful decorative effects, is easily applied and economical in use.

The above are only a few of the many reasons why it is the ideal wall covering for

RESIDENCES, SCHOOLS, CHURCHES, STORES, PUBLIC BUILDINGS

But be sure it's Dull Koted.

Johnston's Dull Kote Paint contains no white lead or anything injurious. It will not rub, flake or peel off, dries hard with a washable surface, free from brush marks or laps.

We will send any Architect, Carpenter or Owner our free color folder and valuable suggestions for interior decoration. Send your name in today.

The R. F. Johnston Paint Co.
Pearl and Main Streets, Cincinnati, Ohio

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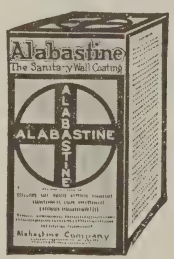
Alabastine
The Sanitary Wall Coating

THE demand for the **best** grade of wall coating is steadily increasing. Old slap-dash kalsomine methods prevail only in the cheap job districts. Owners of better class buildings have found superior decorating a tremendous asset in renting and selling property.

Interior Decorating Experts Rank Alabastine Co. Products — Highest Grade On the Market

Alabastine
The Beautiful Wall Tint



In dry powder, ready to mix with cold water, applied with a regular 7 or 8-inch wall brush; packed in full 5-lb. packages, in white, tints and colors —also in bulk for large jobs.

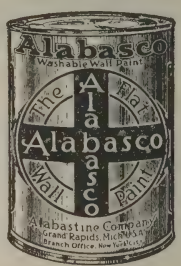
Alabastine may be easily washed, if desired, from any surface which it has been applied to.

Alabastine, after being mixed, will remain in working condition for days, does not harden nor set in the bucket.

Full 5-lb. packages; white 50c, regular tints 55c. **Also in bulk for large jobs.**

Alabasco
The Flat Wall Paint

Alabasco is the highest grade, interior flat wall paint produced. It is washable and absolutely dependable. For homes we recommend the use of Alabasco in connection with Alabastine. At a little extra cost Alabasco can be used in places exposed to finger marks—along the stairs, nursery, lower part of bathroom and dining room, also kitchen and cupboards. These exposed places can then be washed with soap and water. It comes in the same velvet-like water color tints as Alabastine. Is exquisitely soft and artistic on the walls and, properly applied, does not chip, peel or rub off. Comes in liquid form ready to apply.



Hotel, Club, Office, Store, Apartment and Home Decoration —Send for Samples—

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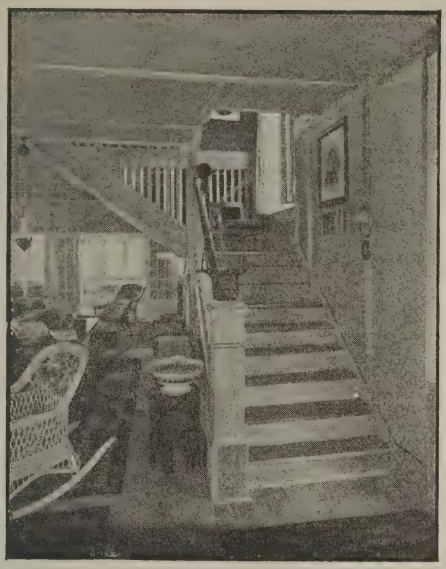

Somebody may make a Better Wall Board some day— Nobody has done it yet

Utility Wall Board is a tough fibre board put together with two insulations of natural waterproof asphalt, rolled under tremendous pressure into one solid compact sheet and surfaced on both sides with special moisture proofing. It is the only Wall Board made under this scientific Moisture Proof Process.

UTILITY WALL BOARD

takes the place of both lath and plaster—It is very tough and durable—It is easily cut with an ordinary saw and is nailed direct to the studding.

It will not warp, or crack, or shrink—and may be decorated in any style desired.

Anyone who can use a hammer and saw can put it on and there is none of the muss and dirt of plastering—You don't even have to wait for it to dry.

It is used in building the new house—and in making over the old—Put it on right over old and cracked plaster if you wish—The cost is less than lath and plaster.

We want to send a sample to every carpenter and builder and home owner—Write for yours

THE HEPPES COMPANY, 4502 Fillmore Street CHICAGO, ILL.

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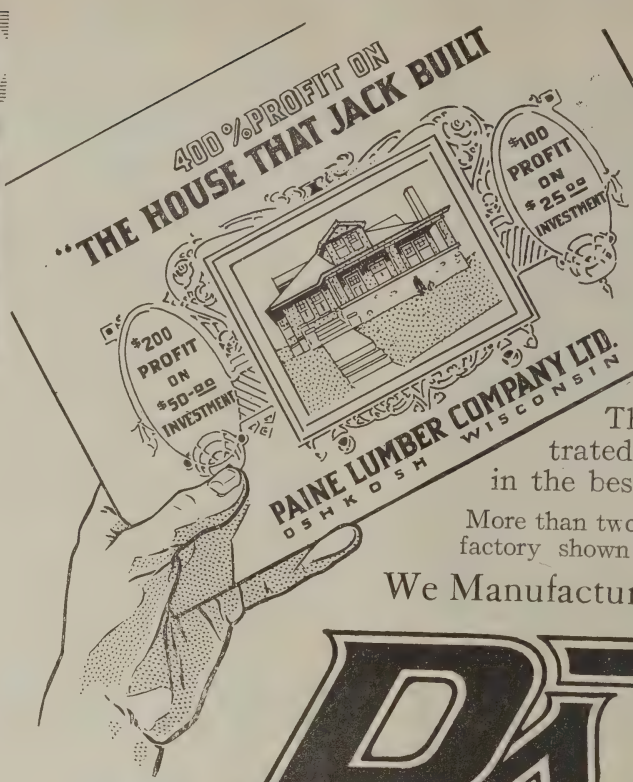
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"THE HOUSE THAT JACK BUILT"
$100 PROFIT ON $25.00 INVESTMENT
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KLIMAX

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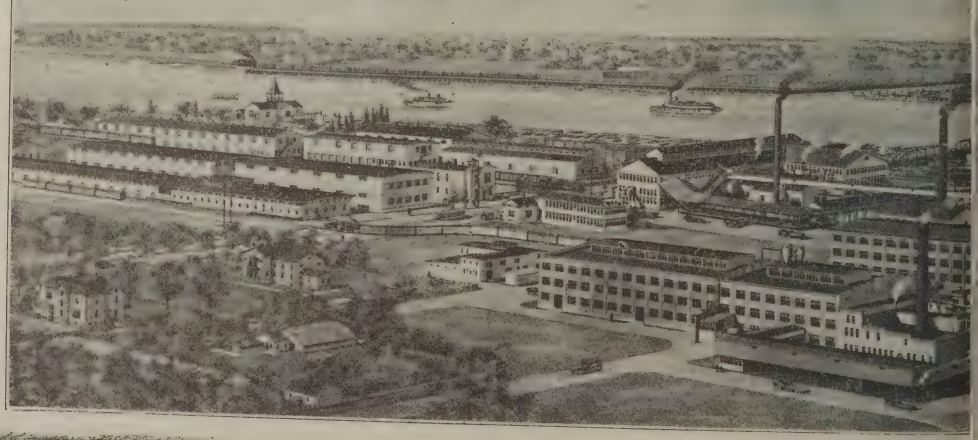

PAINE

KORELOCK

To Make More Money
CUT OUT TWO THINGS:—

prices and *low quality*. They *don't pay*.

THIS COUPON and get the NEW PAINE BOOK—it DOES pay

you will receive promptly our *new* volume "*The Built.*" It proves that by spending $25 more for trim you increase your value $100—how by spending doors and trim you add $200 value.

experience of a home-builder and is attractively illus- *detail drawings* and examples of the best selling styles *this book. Write for No. "C." Get it at once.* You *need* it.

veneered doors reach the user through the immense PAINE ited from contractors and builders throughout the world

in Millwork—in Every Kind of Wood

LUMBER CO., LTD.

HARDWOOD VENEERED DOOR"

NSIN, U. S. A.

KORELOCK

Paine Lumber Co., Ltd.
Oshkosh, Wis.

GENTLEMEN: Please send me your book, "*The House That Jack Built,*" by return mail.

Name.....

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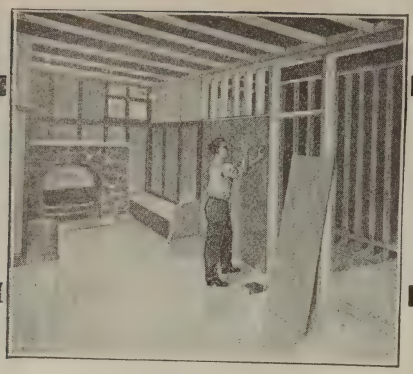


This Modern Wall Lining Makes Good Under Severest Tests

By every test, Compo-Board has proven itself the most satisfactory wall-lining. It has stood the test of time for periods of ten to twelve years in hundreds of homes. It resisted earthquake shocks in California which crumpled plaster walls. It keeps the bitter cold out of log cabins in Alaska. Furniture manufacturers using it in their products found that it will not warp. In apartment houses it has stood rough usage, the knocks of furniture and the kicks of children without injury—without peeling or crumbling. It has made thousands of homes everywhere better places in which to live.

Our booklet and sample will explain why every user of Compo-Board including the U. S. government, well known Universities, big hotels and apartment house owners, home owners, contractors and builders prefer it to any other wall lining. There are money making hints in this book for you. Just send your address on a postal.

Northwestern Compo-Board Co.

5776 Lyndale Ave. No., Minneapolis, Minn.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

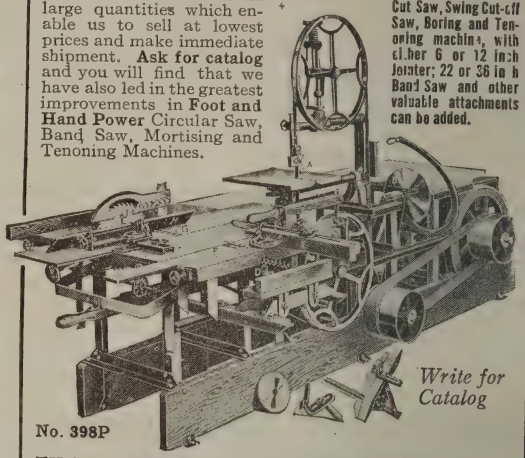
Parks Portable Single and Combination

Woodworking Outfits

We are the originators of the Circular Saw, Band Saw, Jointer Combination; our latest innovation, **Swing Cut-Off Saw** on same base; long table surface; saw pulls across timber instead of pushing long timbers across saw. All machines ready for instant use. Patents on improvements applied for.

Machines are made in large quantities which enable us to sell at lowest prices and make immediate shipment. **Ask for catalog** and you will find that we have also led in the greatest improvements in **Foot and Hand Power** Circular Saw, Band Saw, Mortising and Tenoning Machines.

Circular Rip and Cross-Cut Saw, Swing Cut-off Saw, Boring and Tenoning machine, with either 6 or 12 inch Jointer; 22 or 36 inch Band Saw and other valuable attachments can be added.



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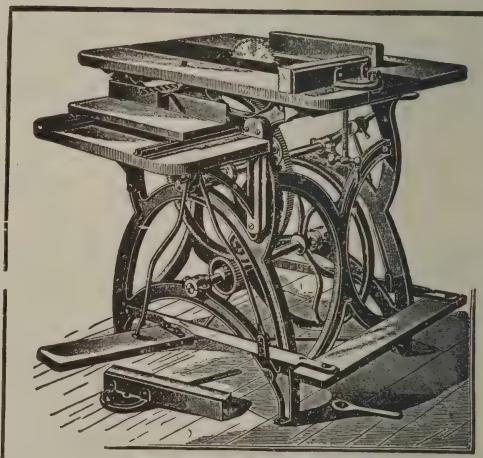
THE PARKS BALL BEARING MACHINE CO.

Knowlton and Fergus St. Cincinnati, Ohio, U. S. A.



MARSTON'S

Hand and Foot Power Circular Saw

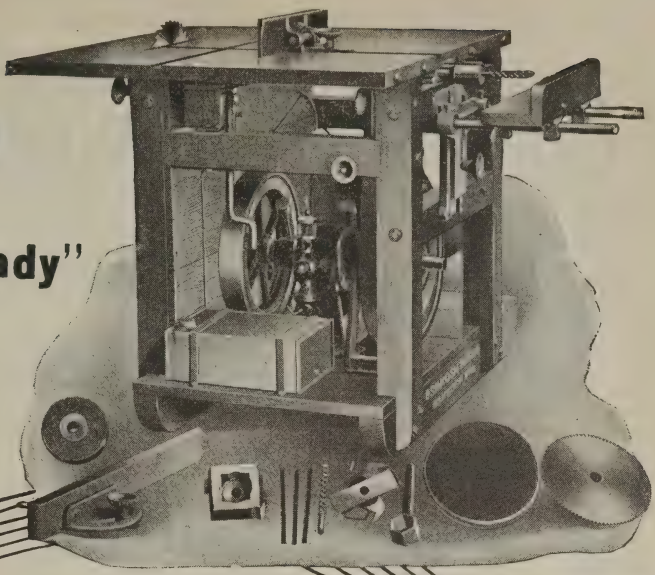
Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two . -nch saws and two crank handles with each machine. Weight, complete, 350 pounds.

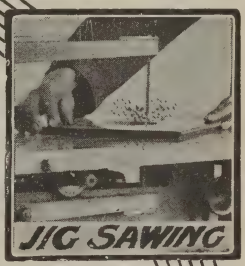
Send for Catalog

J. M. MARSTON & CO. 193 Ruggles Street BOSTON, • MASS.

The TRADE OSHKOSH MARK "Eveready"

Does a whole lot besides sawing—more than these pictures show





Seven Extra Attachments FREE

By "extras" we don't mean the wrench, spark plug and rip and crosscut saw blades—things that belong to every saw rig. You get seven REAL attachments absolutely free—right at the time, NOT later for a "slight extra fee." The "Eveready" is a "whole planing mill in itself."

Only four extra operations are shown here—yet besides a rip and a crosscut saw (10-inch sizes) you get all these extras:

JOINTER HEAD—This works on exactly the same principle as an up-to-date planer. Produces a smooth, even job, with no deep cut as the material leaves the jointer head. 2½ inches in size.

BORING ATTACHMENT—A high-class attachment. Guaranteed absolutely accurate. Extra long boxes insure easy long-running qualities on the guides. Bits, standard size.

JIG SAW—Not a cheap one, but the best 12-inch jig we can make. All joints reinforced with steel, equipped with brass bushings. Once use it and you won't part with it.

SANDER—The best one yet—a great time and money saver over old methods in change and economy of paper. Our methods of holding paper will not blister as do many others. 10 inches in diameter

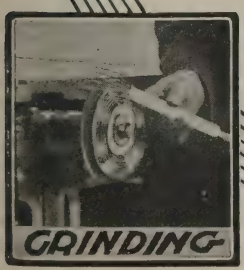
SAW GAUGE AND MITRE DEVICE—Saw gauge of best gray iron, 18 inches long, adjustable to any bevel. Mitre device adjustable to any angle and can be used as a cross-cut gauge.

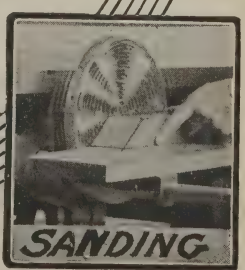
DADO HEAD—Our own special design. Does smooth, even work with or across the grain. Makes window frames, dadoes, etc.

EMERY WHEEL—A 6-inch wheel made for grinding tools is also furnished with this rig.

"Guaranteed for Life" Try the "Eveready" a Week Free

Put all its attachments to work—right on the job. Two men can easily swing it into a light wagon and have it there in no time. If after seven days you can get along without it (which we doubt) notify us and we will take it away at once—no charge whatever for the trial. Send for printed matter and full particulars of this offer today—get in on some of those low but very profitable bids that bob up every day and play so much havoc with things.





Oshkosh Mfg. Co.

414 So. Main St., OSHKOSH, WIS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE STANDARD PORTABLE COMBINATION WOODWORKER

NINE MACHINES IN ONE EQUIPPED WITH 6 H. P. ENGINE

SEND FOR ILLUSTRATED CATALOGUE

ATLANTIC ENGINE COMPANY, Inc.

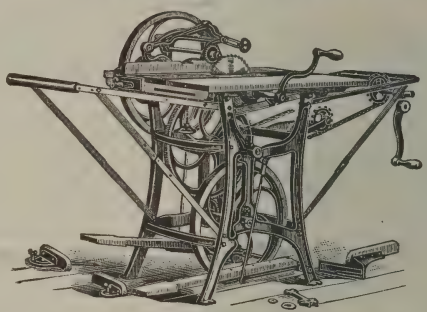
MERCER STREET - - - - MEADVILLE, PA.

CANADIAN OFFICE, BRIDGEBURG, ONT.

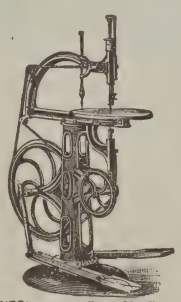
FOOT, HAND AND LIGHT POWER

Wood-Working Machines

Carpenters, Builders, Cabinet-Makers and other wood-workers can successfully compete with large shops by using our labor saving machinery. Save for yourself some of the profits you have been paying to the mills. With our machines one man will do as much work as four to six men using hand tools; will do it easier; will do it better.



No. 5 "Union" Self Feed Rip and Cross-Cut Saw



"Victor" Scroll Saw.

"Diamond" Mortiser

Send for catalog "A" describing our complete line

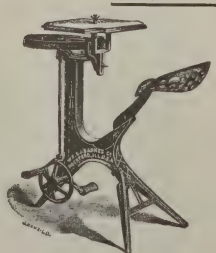
THE SENECA FALLS MFG. CO.

629 Water Street SENECA FALLS, N. Y., U. S. A.

(249)

Barnes Hand and Foot Power Machinery

Complete Outfit for CARPENTERS AND BUILDERS



Improved Former has an adjustable table. Knives can be instantly reversed to suit the grain of wood. Speed of knife is 2,500 per minute, thus insuring smooth work.

Improved No. 7 Scroll Saw

Warranted to be well made; will saw pine three inches thick at the rate of one foot per minute. Other woods in same proportion according to hardness. Price, $15.00.

We make Sixty Styles of Knives
SEND FOR NEW CATALOG

W. F. & JOHN BARNES CO.

436 RUBY STREET
ROCKFORD, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Your Business Needs a Famous Universal Woodworker

You **must** have realized the advantages of doing your own millwork instead of having it done by a planing mill. Surely you realize that the profits made by the planing mill **come out of your pocket!** And no doubt you have realized how troublesome delays and costly mistakes would have been avoided had the millwork been done in your own shop.

Then why haven't you installed your own machinery?

Couldn't afford the large investment? Couldn't spare the space in your shop? Haven't the volume of work to keep them busy all the time?

The above are the usual reasons—and **very good** reasons. But they **don't hold** good when a FAMOUS Universal Woodworker is considered.

One investment in **one** machine puts a miniature planing mill right in your shop. Just **one piece of machinery,** occupying very little floor space, requiring very little power to run, and allowing four men to work on it at the same time.

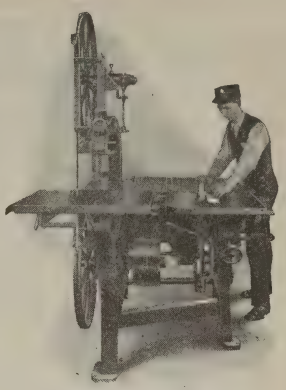
You **don't have** to invest in a machine that you seldom use. The FAMOUS woodworker does up to **sixteen** different kinds of work—all on the same machine—whenever you want it.

Over 1,300 Carpenters, Builders and Contractors have found FAMOUS Universal Wood workers **profitable.** If you would like to refer to some of these actual users, write us, and we'll send names.

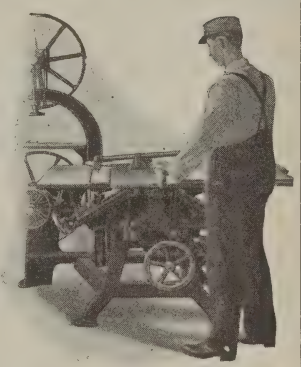
SIXTEEN MACHINES IN ONE, remember, and the FAMOUS is guaranteed for life. No room for more details here, but **write for the catalog**—it will pay you.

The Sidney Tool Co.

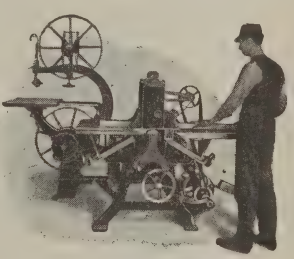
Sidney :: :: :: Ohio



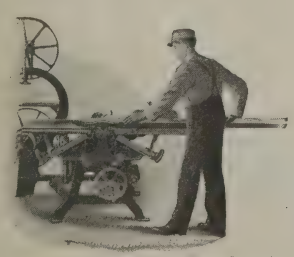
Single Spindle Shaper



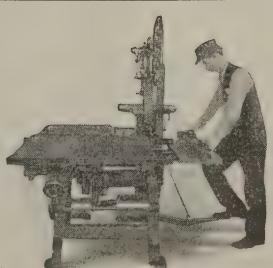
Single End Tenoner



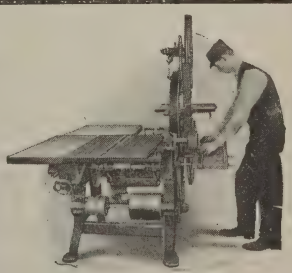
Power Feed Planer



Pole Rounder



Hollow Chisel Mortiser



Knife Grinder

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ORR & LOCKETT HARDWARE Co
Established 1872

¶ Most contractors and builders doing business in Chicago and vicinity know that they save time, trouble and money by sending us their orders for

Builders' Hardware

¶ But there are others who do not realize what an advantage it is to have the benefit of our service, forty years of experience and tremendous buying power, and this advertisement is intended for them.

¶ In the first place we carry at all times the largest and most complete line of builders' hardware in the country, so we seldom have to hold up an order because something is "out of stock." And this huge assortment (including the well known brands), gives you the greatest possible choice of kinds and prices.

¶ We very seldom fill an order with the goods of any one manufacturer exclusively, but select those pieces which are acknowledged to be the leaders in each manufacturer's line. Thus the entire order contains only the highest grade articles—not a weak link anywhere.

¶ In packing our goods for shipment we sort and label each piece from the specifications so that the workmen on the job lose no time in handling. Any contractor will appreciate the great advantage of receiving his hardware in this shape.

Send us your plans or specifications so we may show you

ORR & LOCKETT HARDWARE Co
Established 1872
14-16 W. Randolph St. CHICAGO, ILL.

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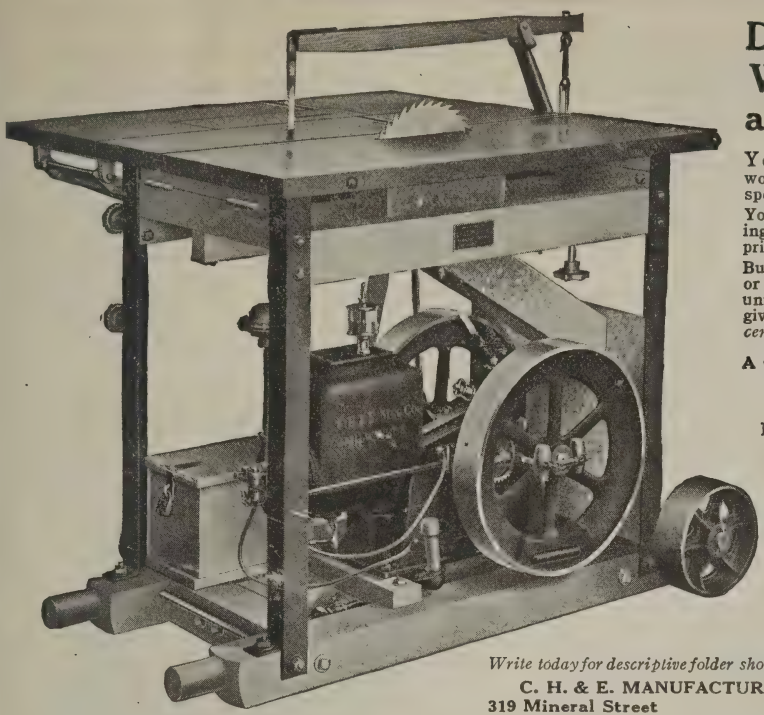


Does All Your Woodworking at 20c per day

You can buy a dozen woodworking tools and build a special shop.

You can have your woodworking done outside at current prices.

But you can't get *better* service or *more accurate* work than this unique woodworking outfit will give you — *at a cost of but 20 cents per day.*

A Complete Woodworking Plant Ready for Instant Service—Anywhere.

In a concise, corner-fitting outfit, you get saw, jointer, sander—twelve machines in all.

No delays. No idle machines. A man readily wheels this tool to the spot needed and does the work at once.

This is the original portable saw rig—embodying wide experience in the manufacture of concise, convenient and sturdy tools. Driven by self-contained gasoline engine or can be connected for belt drive.

Write today for descriptive folder showing different sizes and prices

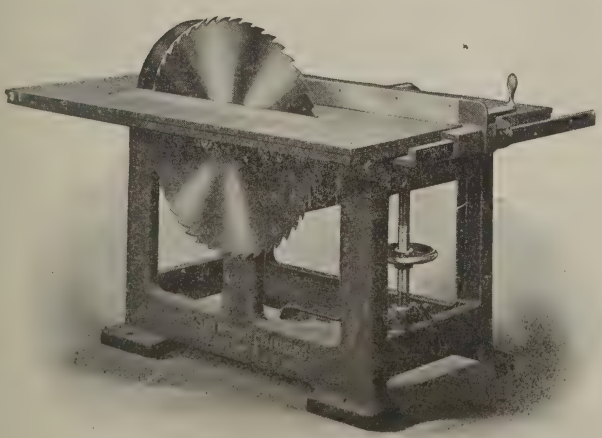
C. H. & E. MANUFACTURING COMPANY, Inc.
319 Mineral Street **Milwaukee, Wisconsin**

OF SMITHVILLE

Established 1847

Woodworking Machinery

Incorporated 1878



A NEW HEAVY Saw Bench with Parallel Hoist to Table

Send for Circular at once.
Address

H. B. Smith Machine Co.

SMITHVILLE, N. J.

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THE AURORA CUPOLA-VENTILATORS FOR STABLE VENTILATION

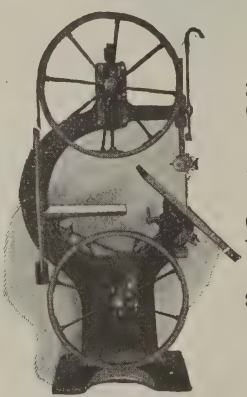
offer greater ventilation capacity than the old fashioned wooden ventilator

AURORA CUPOLA-VENTILATORS are made of the best galvanized steel—have inside screens giving protection against birds entering—and are shipped "knocked down"—all ready to put in place by the most inexperienced person. WRITE US FOR CIRCULARS OR ASK YOUR DEALER to show you one. Specify Aurora Cupola-Ventilator on your next stable job. It cannot help but be satisfactory to all.

MESSENGER & PARKS MFG. CO.

Aurora, Illinois

One of Our Specials



27 inch Complete ⅜ Band Saw
Wright Roller Guide
Weight 800 lbs.
$55.00

32 inch Complete ⅜ Band Saw
Wright Roller Guide
Weight 1100 lbs.
$75.00

Prices F. O. B. Factory. Also a complete line of wood working machinery.
Write us about our special offers.

United Machinery Co.

88-89 Centre St. New York, N.Y.

INTRODUCTORY TRIAL OFFER

Give the Self-Setting Plane a chance to prove its worth, If it fails, return it and we will return your money.

If the SELF-SETTING PLANES are not sold in your town and you write us saying, "I saw your trial offer in N. B.", we will send you particulars, a carpenter's pencil and our $1.00 CERTIFICATE, which we will receive as $1.00 in part payment for a SELF-SETTING PLANE, as stated in our $1.00 CERTIFICATE, and if this S. S. PLANE is unsatisfactory and returned at our expense, we will send you $1.00 more than you sent us, as the $1.00 CERTIFICATE says.

As this paper guarantees we will do as our advertisment says, you know the plane must be O. K.

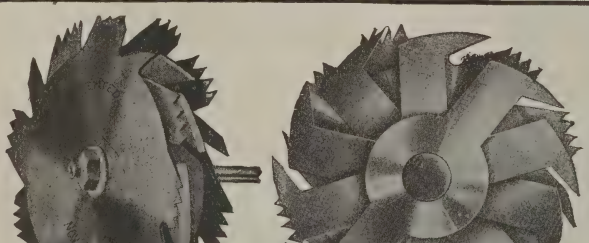
ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained eaty, knurly, knotty, hard or soft wood you can find, THAT IS FREE FROM SAND OR DIRT.

If it is not worth to YOU or YOUR MEN, TWICE ITS COST, return it at our expense, as above stated.

If you send us the addresses of ten carpenters, no matter where they live, we will send you another carpenter's pencil, hard and tough.

Carpenter's Hard, Tough Pencils, 30c per dozen, postage prepaid.

GAGE TOOL COMPANY, Vineland, N. J.



Showing Arrangement of Cutters

HUTHER BROS. PATENT GROOVER OR DADO HEAD

Will Save Cost in Three Days Use

Can Be Used on Any Circular Saw Mandrel

For cutting any width groove from ⅛" to 2" or over. Will cut a perfect groove, either with or across the grain, and leaves edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

HUTHER BROS. SAW MFG. CO.

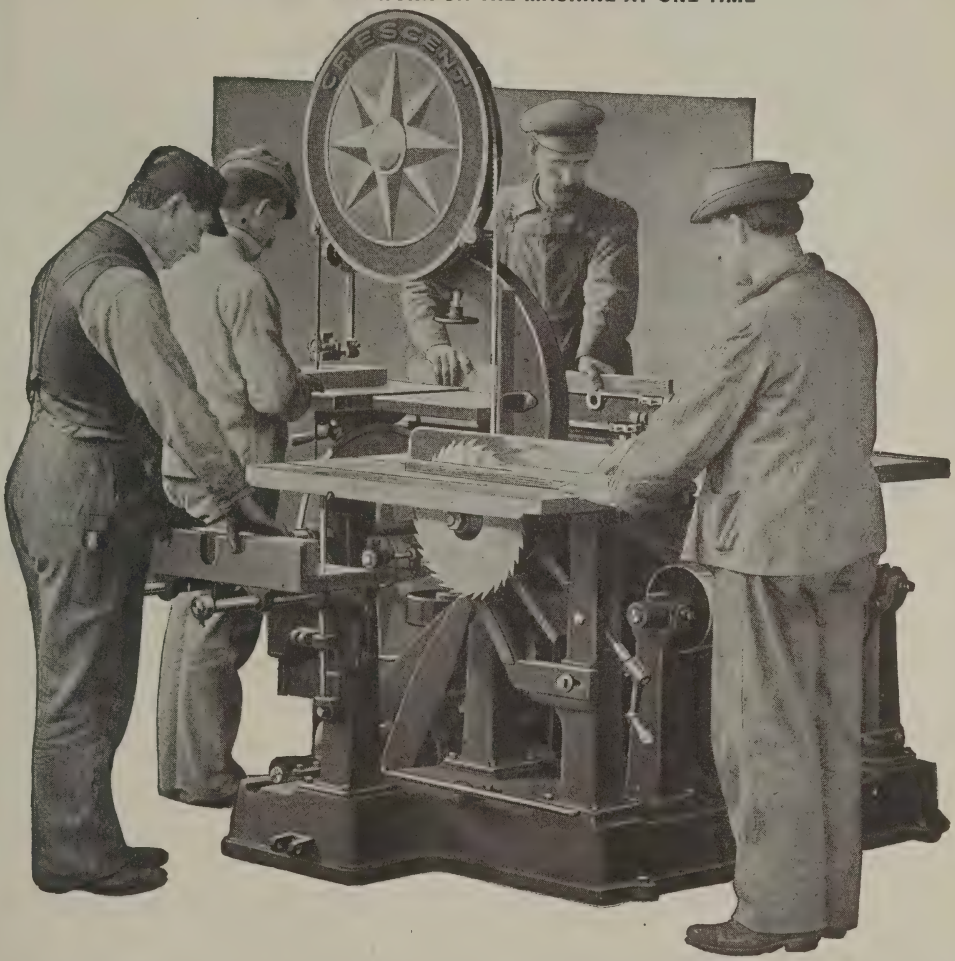
500 University Ave. Rochester, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

INCREASE THE PROFITS FROM YOUR BUILDING OPERATIONS BY TURNING OUT YOUR MILL WORK ON THE

CRESCENT UNIVERSAL WOOD WORKER

FOUR MEN CAN WORK ON THE MACHINE AT ONE TIME



THE CRESCENT UNIVERSAL WOOD WORKER

consists of band saw, saw table, jointer, reversible single spindle shaper, and borer. Various attachments can be added adapting the machine for grinding knives, doing disk grinding, mortising, tennoning, panel raising, resawing, making mouldings, rabbetting.

Send for special catalog No. 51 and find out all about this splendid machine. At the same time ask for catalog of band saws, jointers, saw tables, planers, shapers, variety wood workers, swing saws, disk grinders and borers.

THE CRESCENT MACHINE COMPANY, 10 Main Street, LEETONIA, OHIO

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ÆTNA-IZED?

$3,250 INSURANCE FOR $10

LIFE and ACCIDENT Insurance under the famous

ÆTNA TEN DOLLAR COMBINATION

Issued by the ÆTNA LIFE INSURANCE COMPANY, of Hartford, Connecticut—the largest company in the world writing Life, Accident, Health and Liability Insurance.

In extent and variety of protection this policy is without a rival.

For $10 a Year (In "Preferred" Occupations) **this Policy pays:—**

$2,000 for death from Travel, Elevator or Burning Building Accident.

$1,000 for death from Ordinary Accident.

$2,000 for loss of limbs or sight as a result of Travel Accident.

$1,000 for loss of limbs or sight as a result of Ordinary Accident.

The above amounts accumulate Ten Per Cent. each year for five years, without additional cost.

$250 FOR DEATH FROM ANY CAUSE—No Medical Examination Required.

The Accumulations, Double Benefits and Life Insurance provided by this Ten Dollar Combination make possible the payment of $3,250 at a cost of less than THREE CENTS A DAY in addition to weekly indemnity for total or partial disability from accident.

SEND IN THE COUPON TO-DAY

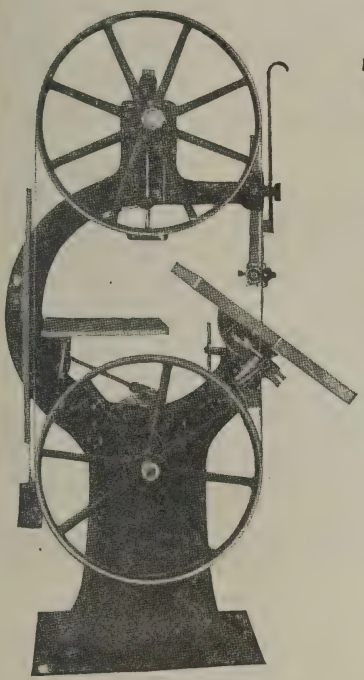
Ætna Life Insurance Co. (Drawer 1341) **Hartford, Conn.** Nat. Bldr. Tear off

I am under 55 years of age and in good health. Tell me about ÆTNA Ten Dollar Combination. My name, business address and occupation are written below.

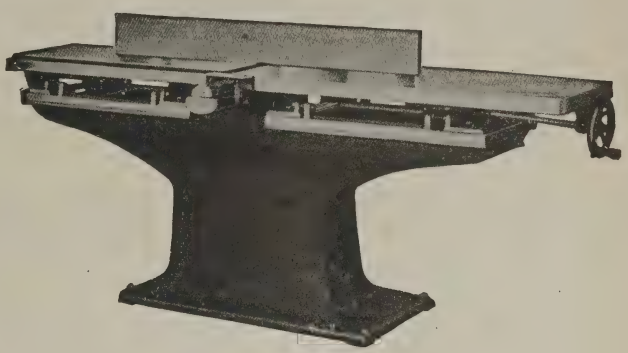
PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

$127.00 for Both To Contractors and Builders

Ask for Price on One if You Can't Use Both



27-Inch Chicago Band Saw



Chicago 8-Inch Jointer and Planer

Used for Planing, Jointing, Shaping, Matching, Rabbeting, Grooving, Chamfering, Beading and Making Mouldings

Use Real Machines

READ what this user writes:

July 1, 1912.

Dear Sirs:

I received my 27-inch Chicago band saw and 8-inch hand jointer together with belting and pulleys shipped by you some time ago, and have been using them ever since—almost night and day, and must say they are as good as money can buy.

Thanking you for your promptness in filling the order, I remain

Yours truly,
F. W. HAWES, Knoxville Ill.

Send for our Free Special Catalogue today. We issue a catalogue of machines especially adapted to Contractor's and Builder's use

Chicago Machinery Exchange

1213-1223 Washington Blvd. Chicago, Ill.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THOSE SIGNS MEAN BUSINESS

And they mean business for you, Mr. Carpenter, because they are being read by millions of people and are teaching those people that there is plenty of

WHITE (AND NORWAY) PINE

of the same high quality that good carpenters have been using for 2½ centuries.

Those signs and the evidence that goes with them, are teaching the people the values of good lumber, and that means good business for good carpenters.

Our campaign direct to the *people* is helping to get more business and better business *for carpenters* all the time, and that is the kind of campaign that *the carpenters* of this country enjoy helping along—because it *pays* them.

Don't YOU?

NORTHERN PINE Manufacturers' Association
1118 Lumber Exchange Minneapolis, Minn.

NAT BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

WHITE PINE
"THE PEOPLE'S LUMBER SINCE THE PILGRIMS LANDED"
WHITE PINE "& plenty of it"
"SIGNS" You Can Believe In.
NORWAY PINE "& plenty of it"

White Pine Home at Highland Park, Ill., Robert Seyfarth, Chicago, Architect

The house illustrated is built throughout of

White and Norway Pine

White Pine was used for all exterior and interior trim including the shingle siding and the entrance construction.

Norway Pine was used for the rough lumber work in framing and structural timbers. And it is the only wood that approaches White Pine in value for window-blinds, screen-sash, storm-doors and similar uses.

According to the United States Government Report, Bulletin 99, White Pine has been

"The Leader in the Market for 250 Years"

It has held that enviable position because of its wonderful durability and beauty of grain and texture and because of its ability to take and hold paints and stains.

For Your Own Protection Get this Book

It will show you both by pictures and text *why* White and Norway Pine offer so much of real *value* to the home builder.

The book is free—ask for it.

NORTHERN PINE Manufacturers' Association
1118 Lumber Exchange **Minneapolis, Minnesota**

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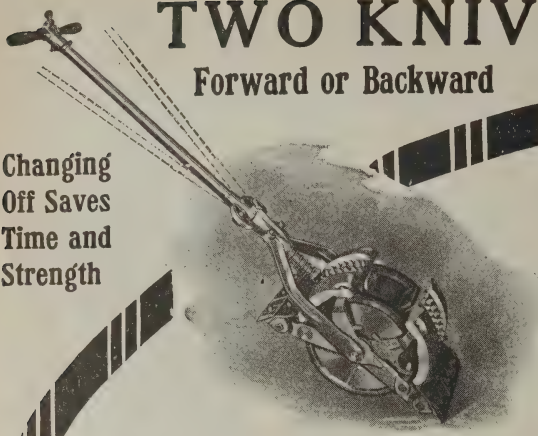
TWO KNIVES—Scrapes

Forward or Backward



Changing Off Saves Time and Strength

Pull a while, then drop rear knife and push a while—the change rests your back and increases your speed. Double knife feature also enables you to reach the center of the smallest room. Knives drop at either end and let you right into the angle of the baseboard.

The WEBER DOUBLE ACTING Floor Scraper

works perfectly at all angles on **any** flooring—maple, oak, yellow pine, fir—with or against the grain. Accurately balanced; makes a smooth "shearing" cut without a bit of side draft. But prove its worth. Try it yourself five days **free**—a couple of days on your hardest, fussiest job, bringing every feature into play. Then put it up against any other make you know of. If its work isn't the best you ever saw, return it—the trial won't cost you one cent. Take advantage of this—

Try It Five Days FREE

and decide the scraper question once for all. Send **now** for full details of this offer and our new circular just off the press, showing the Weber point by point, clearly and simply.

JOHN F. WEBER, President
WEBER MFG. CO.
661 71st Ave., MILWAUKEE, WIS.

Can't Chatter or Leave Waves in the Flooring.
Scrapes Every Inch of Space.

FRANK CAMPION

can temper a Floor Scraper Knife better than any other man in the country. No matter what kind of a scraper you have—he will make you a knife any size or shape—

And Such a Blade!

That's his specialty. And the price is no more than you pay for the kind that is manufactured in big quantities without that careful workmanship. If you need new scraper knives write at once to

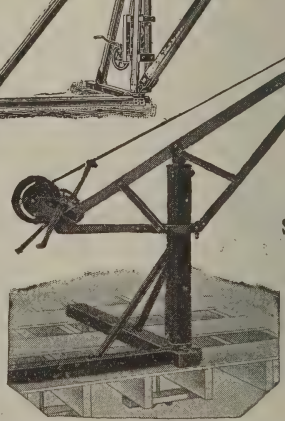
FRANK CAMPION
care of Fox Supply Co.
BROOKLYN, WISCONSIN

Light, Strong, Quickly Put up
Stiff Leg Derrick

split mast and boom for hand and power use. Equipped with all crucible steel fittings and gears, capacity 2 tons. For prices give length of boom, and if winch is desired.

Sasgen Circle Swing Reinforced
Builders Derrick
$45.00

complete ready for use with geared winch, 150 ft. 5-16" cable, block fasteners, etc., capacity 2500 lbs.



Our Motto: Satisfaction or no Sale.

—

Write for Catalog "N"

SASGEN BROS. 2053-57 Racine Ave., **CHICAGO**
New York Office, 103 Park Ave.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Scrape Up Money From the Floor

BY RENTING A

Triple "A" Spring-Driven Floor Smoother

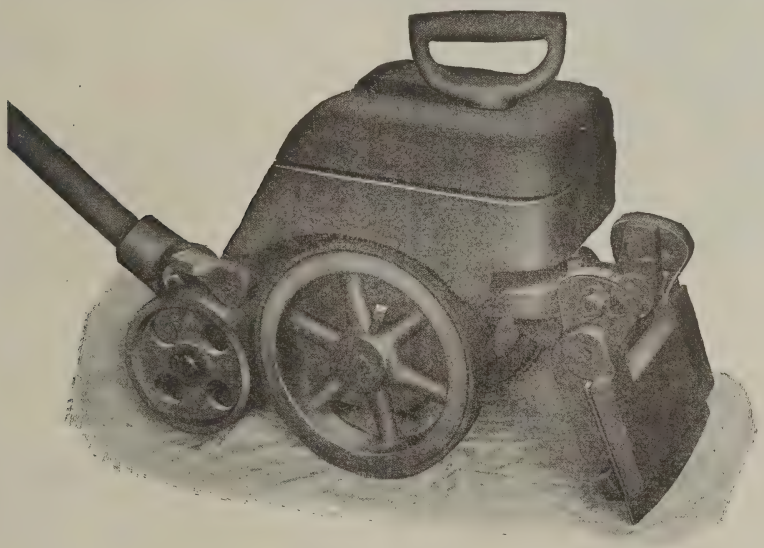
The money you save on each job will pay heavy dividends on our low rental charge. Apply these dividends to the purchase of the machine, and

THE REST IS "TRIPLE "A" VELVET"

You are under no obligation in trying out the TRIPLE "A,"—the best floor surfacing machine in the world. When you get it, you will find it is

A TRINITY OF WORK-PERFORMING POWER

for it's a Scraper, Sander and Blade-Sharpening Machine in perfect combination.



Every floor needs a scrape now and then in your territory, so you need a Triple "A" Machine all the time. There's money in Triple "A" scraping.

TEAR OFF THE COUPON

Triple "A" Machine Company

28 North Clark Street

Chicago

Pin Coupon to your *Letterhead.* Send particulars of your rental proposition and folder describing the **Triple "A" Spring-Driven.**

Name .....

Address .....

Business .....

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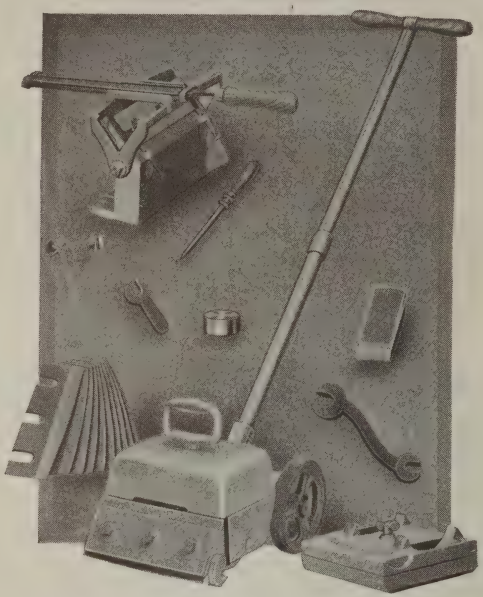
NAT. BUILDER

Try It Free

and thereby convince yourself just what the



Acme Floor Scraping Outfit

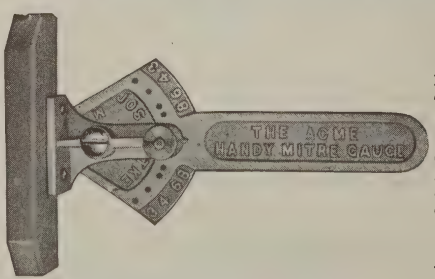
can do on your own work

I do not expect or want you to buy a machine that you are not thoroughly familiar with, so in order to introduce my equipment to you and to permit you to fully investigate into its merits, I make you this offer:

I will send the complete Acme Floor Scraping Outfit, as here shown, to you for a WEEK'S FREE TRIAL. I will allow you to work the machines and if after you have given them a thorough trial you find that they do not meet with your entire approval, simply send the outfit back to me and you will owe me nothing.

If this proposition sounds reasonable and you want more information, drop me a line today and I will forward booklet and full particulars by return mail.

The Acme Handy Mitre Gauge



is one of those little tools that is a great time saver. It fits in the pocket where it is always ready for immediate use. The dollar that you pay for this mitre gauge is the best investment that you ever made. If your dealer can't supply you, I can. Guaranteed absolutely accurate.

I have a circular that gives full particulars. *Write for it today.*

JOS. MIOTKE, 249 LAKE STREET MILWAUKEE, WIS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"KEEP THESE MEN!"

"It Would Be Hard to Replace Them Because They Have Special Training"

When the employer cuts down the pay roll it is the untrained men that go. Untrained men are easy to get at any time. But the employer keeps the trained men as long as possible, as he knows it will be difficult to replace them. His finger will sooner or later go down the pay-roll list on which your name appears. Are you one of the men whom he would like to hold? If you are not, I. C. S. training will keep you on the pay roll.

It makes no difference where you live, under what conditions you work, the I. C. S. will bring to you in your spare time, at small cost, the kind of training that the employer values—the training that will qualify you for a more congenial position—the training that means advancement and a larger salary.

You can get this training. Simply mark an X in the coupon opposite the name of the Course in which you are interested, write your name and address, and send it to us. We will tell you how thousands of men who were situated just as you are have risen to positions of trust and responsibility through I. C. S. training. We have trained thousands and can train you. Make the employer say "Keep That Man" when he reaches your name. It will cost you only a two-cent stamp to find out how it can be done.

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Please explain, without further obligation on my part, how I can qualify for a higher salary and advancement to the position, trade, or profession before which I have marked X.

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Structural Draftsman	Commercial Illustrating
Concrete Construction	Mining Engineer
Electrical Engineer	Gas Engineer
Electric Lighting	Automobile Running
Plumbing & Steam Fitting	Bookkeeper
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Estimating Clerk	Advertising Man

*Name*_____

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*City*_____ *State*_____

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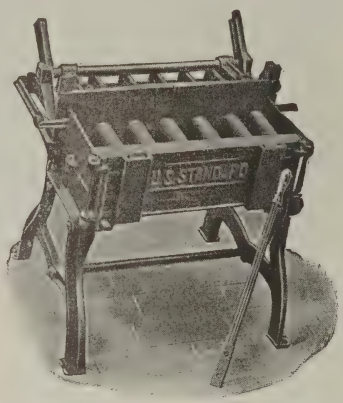
NAT. BUILDER

PROFITS

In block making are dependent on the simplicity of the block machine to operate quickly and with a sureness of turning out each block perfect.



Three reasons why the **U. S. Standard Block Machines** make money for contractors and builders:

Simplicity

With its sturdy and simple construction any amateur can operate it with a few hints on the essential points. No clamps, chains, cogs, wheels or springs to get out of order.

Speed

Its simplicity gives greater speed than more complicated machines. We challenge competition.

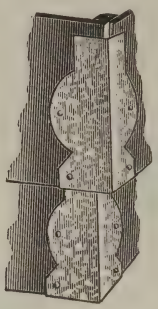
Strength of Block

The greater number of small cores instead of two large ones give as much air space and more strength. This is why U. S. Standard made blocks are the nearest to perfection.

Send for detailed information on cost of machine and block making.

The Ashland Steel Range & Mfg. Co.
Ashland, Ohio

More Profit For You.



You can now give your customer the popular mitre-corner effect without the slow, careful work of cutting and fitting bevels.

Use Metal Building Corners

They take the place of corner boards. Save fully $2 worth of time in finishing each corner, make a stronger and neater job.

WRITE FOR FREE SAMPES TODAY.

F. D. KEES MFG. CO. BEATRICE, NEB. Box 811

If you've never used Gossett Hinges for full length window screens, say so and we'll send you a sample pair free.

THE EXCELSIOR DUMB WAITER

Sent Complete to a Nail **$18.50**

Knocked Down, Ready To Erect

Self Retaining Machine. Hardwood Car. Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one.

Send for Descriptive Pamphlet

R. M. RODGERS & CO.
74 Emerson Place, Brooklyn, N. Y.

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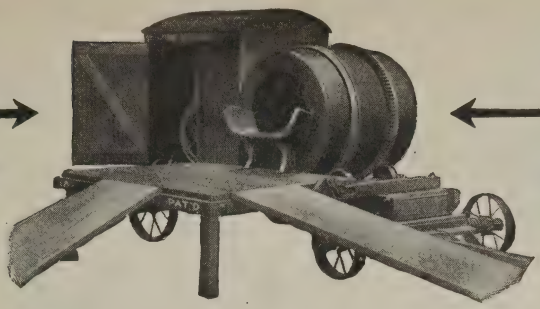
"The Standard" Low Charging Concrete Mixer with Folding Platform



¶ This type of mixer has many advantages, especially where the mixer is moved frequently as the work progresses or from one job to another. The platform can always be folded in front of the drum for moving, and as soon as it arrives on job it is dropped down in mixing position, making a wide platform ready for immediate use.

¶ The low charging platform is only about 2 feet high.

¶ The semi-automatic discharge operates from either side of the drum and is the quickest and simplest on the market.

¶ The open drum allows the inspection of the material while mixing, assuring a uniform grade of concrete.

Built in 10 different sizes and with any kind of power.
Our catalog No. 32 is yours for the asking.

The Standard Scale & Supply Co.

CHICAGO 1345-47 Wabash Ave. | PITTSBURGH 243-5 Water Street | PHILADELPHIA 35 South Fourth Street | NEW YORK 136 West Broadway

Lay Your Own Concrete

AS the forests are cut, builders turn to concrete. Concrete construction is not difficult. It pays liberal profits. Hundreds of contractors are going into concrete every year. *You* can start with a small investment—some wheelbarrows, shovels, small tools and a

Smith Hand Mixer

IT is a *batch mixer,* guaranteed to mix a perfect batch in three slow, easy turns of the drum. Cranks easily—popular with the men

Batch capacity 2½ cu. ft. Output, 25 to 30 cu. yards per day. Weight, 1000 lbs. Guaranteed fully by the biggest mixer concern in the United States.

The T. L. Smith Co.
1336 Majestic Building
Milwaukee, Wisconsin

Let us send you our guarantee and booklet No. 18.

SMITH HAND MIXER 1912 MODEL

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CYPRESS "THE WOOD ETERNAL"

U. S. GOVERN

(Dept. of Agriculture,
issued June 3

CYPR

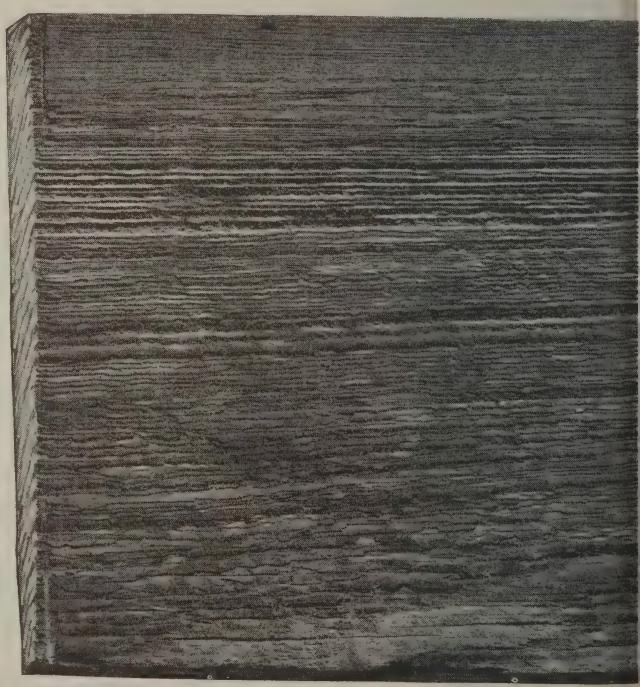
"As Siding It Practically W

(FROM PAGE 44, U. S. GO

Same report says "CYPRESS" shows paint well an

(*You Know the Conservati*

Here's a Photograph, (straight from the wood) of a piece of *Cypress Siding* taken from St. Charles College, La., duly attested in writing by the President, Father Maring. Built 1819—torn down 1910. *NOT A TRACE OF ROT.* Note that the lower or exposed edge, originally the thicker, has become the thinner by the simple erosion of nearly a century of rains.



CYPRESS SIDING SOUND as a DOLLAR after withstanding the tempests of a century and willing to start again. *91 YEARS "ON THE JOB" WITHOUT EVEN PAINTING*, on a church in use till the day it was razed to make room for a larger building, and the *CYPRESS LUMBER COMPOSING IT THEN USED AT ONCE* to erect a new gymnasium!

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

MENT REPORT

est Service, Bulletin 95)
1911, says of

ESS:

ears Out Before It Decays"

ERNMENT BULLETIN 95)

olds it for many years, but lasts a long time without it."

of Government Reports)

THERE'S INVESTMENT VALUE WORTH WHILE!

WRITE TODAY for VOLUME ONE of the CYPRESS POCKET LIBRARY, with Full Text

of OFFICIAL GOVT. REPORT as quoted above. (Sent FREE *promptly* on request)

"WOOD THAT WILL STAND THE GREENHOUSE TEST WILL STAND ANYTHING"

ASK FOR VOL. THREE—ALSO FULL OF VITAL FACTS

When planning new improvements or repairs to old ones, just remember—
"With CYPRESS, you BUILD BUT ONCE"

Let our "BUILDERS' HELPS DEPARTMENT" help YOU.
Our entire resources are at your service with Reliable Counsel.

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1212 Hibernia Bank Building, New Orleans, La.

INSIST ON CYPRESS AT YOUR LOCAL DEALER'S.
IF HE HASN'T IT, *LET US KNOW IMMEDIATELY*

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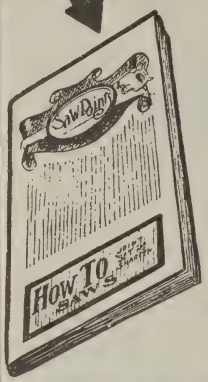
NAT. BUILDER

How to Set a Saw

FREE to Carpenters and Builders



Hundreds of carpenters and others have written us for our booklet "Saw Points." We are glad to send it to anyone interested in the proper way to *Set* and Sharpen Saws. For 30 years we have been making the Morrill Saw Set—nobody has ever made a *Saw* Set that equals the Morrill—fully described in our booklet which is free to you.

CHAS. MORRILL,

279 BROADWAY NEW YORK

Trus-Con Joist Hangers

Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.

Avoid cutting away and weakening of timbers and walls—save labor, time and money.

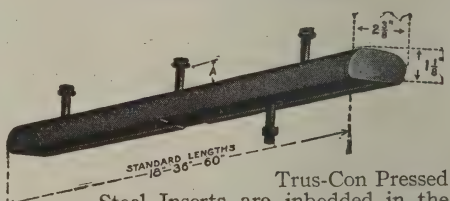
TRUS-CON JOIST HANGERS are made from open hearth steel plates, and are proven by actual test to be the strongest on the market. Note the bulb-shaped reinforcement at upper angle.

We also furnish Post Caps, Post Bases, Wall Plates and Base Plates made in rolled steel, malleable iron or cast iron.

Write for catalog and prices.

Shaft Hanger Supports for Concrete Buildings

Trus-Con Pressed Steel Inserts for Supporting Shaft Hangers in Concrete Buildings.



Trus-Con Pressed Steel Inserts are inbedded in the concrete during construction, saving expensive drilling after completion of the work. The long slots allow a wide variation in position. Special washers prevent bolts turning in the slots.

Write for details and prices.

TRUSSED CONCRETE STEEL CO.

384 Trussed Concrete Bldg. - DETROIT, MICH.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The NATIONAL BUILDER

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ARE THE BEST

FOR SALE BY ALL HARDWARE DEALERS. Bommer Bros., Mfrs., Brooklyn, N. Y.

ONE TON OF COAL WILL DO THE WORK OF TWO IF YOUR HOUSE IS LINED WITH

CABOT'S SHEATHING "QUILT"

NOT a mere felt or paper, but a matted lining that keeps out the cold as a bird's feathers do. Incomparably warmer than common papers, and warmer and cheaper than black plaster. Costs less than 1c a foot. Keeps houses warm in winter and cool in summer. Has no equal as a sound-deadener for floors and partitions.

Send for sample and catalogue—free.

SAMUEL CABOT, Inc., Sole Manufacturers, BOSTON, MASS.
350 Dearborn Ave., Chicago 1133 Broadway, N. Y.

Cabot's Shingle Stains, Waterproof Cement Stains, Waterproof Brick Stains, Conservo Wood Preservative.

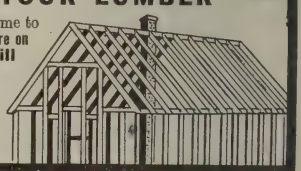
High Grade Material—Low Grade Price
Satisfied Customers—More Profit for You

Mr. Contractor—You are directly and vitally interested in the quality and price of lumber you use. ¶ You can satisfy your customers easier and more surely when you work up the high grade stock you get from us than if you have to contend with the inferior grades of the Line Yards. Your work is easier; you can put a better building in less time—

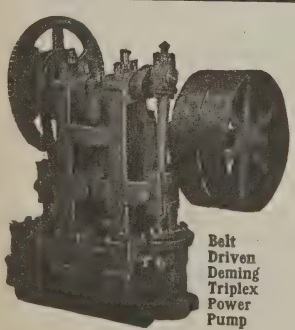
AND WE'LL SAVE YOU A GOOD SUM ON YOUR LUMBER

Write us for estimate on what you want. Next time you need a car load of lumber, come to Dubuque. We have everything you need for a building, **and will refund your railroad fare on a carload order.** Besides, **we have a special proposition to make that will interest you.**

¶ Better get in touch with us at once, as lumber is going up. Write today.



PETER J. SEIPPEL LUMBER CO.
217 S. Locust Street, DUBUQUE, IOWA



Belt Driven Deming Triplex Power Pump

DEMING PUMPS

May be belt driven or direct connected to electric motor, gas or gasoline engine. Made in all sizes for any service.

Ask for our Power Pump Catalog

THE DEMING COMPANY

SALEM, OHIO

Hand and Power Pumps for All Uses

General Western Agents **Henion & Hubbell, Chicago**

Other Agencies in All Principal Cities

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THE NATIONAL BUILDER

Vol. 54 (48th Year) CHICAGO, OCTOBER, 1912. No. 6

The Leavenworth House, built at Omaha, Neb.

I. P. HICKS, Architect

NATIONAL BUILDER DESIGN No. 358.

For Floor Plans, Details, etc., see Supplement of this number. Estimated cost, architect's fees not included, $2,825.82.

The Leavenworth House

THE problem of the architect designing a small house is to provide as many large rooms as possible with a harmonious arrangement and without the appearance of crowding. Few of the smaller buildings are erected without a close watch being kept on every penny of expenditure and without a great deal of thought on the part of both the architect and owner. Where unlimited means are available, an exceedingly pleasing arrangement can be made, but with limited means, the architect must use all his

The Leavenworth House

I. P. Hicks, Architect

talents in keeping within the required amount while furnishing the necessary rooms and equipment.

In the Leavenworth House the architect was confronted by problems such as these. One of the requirements was that there must be four sleeping rooms on the second floor. This, of course, meant that closet space must be provided as well as the bath room, and the arrangement shown indicates how well the architect succeeded, there being very little waste space in any of the rooms or halls. On the first floor there are several points of interest. It will be noted that there is a clothes closet between the kitchen and hall, which makes it convenient for both entrances. The hall, parlor and sitting room open into each other, providing a large space for a social gathering, while still meeting the needs of the average small family.

The use of a bay window extending through the two stories provided a considerable amount of space for both rooms at a comparatively slight increase in expense. The extension for the stairs really added considerable room to both the first and second floors, as it permitted starting and landing in a much more convenient place. The house as built was equipped with a furnace in the basement, thus providing every room in the house with heat.

On the exterior the house presents a pleasing appearance; the sweep of the hipped roof rising from a deep cornice which, with the corner boards and porch trim, constitutes a very good example of colonial design.

A great many do not realize the importance of trees and shrubbery in the ornamentation of a house. When houses are built close together, this, of course, is more or less difficult, but it is always possible to properly shade the front by individual trees, or groups of well arranged shrubbery. The use of climbing vines is a matter of individual taste, but as a rule they are not as appropriate for frame buildings as masonry. Besides, the need of frequent painting destroys the hold which the vines have upon the house, and the periodical bare appearance is not attractive.

Estimate of Leavenworth House*

By I. P. HICKS.

EXCAVATING AND MASONRY.

140 yards excavating, 35c	$ 49.00
74 yards cement cellar floor, 50c	37.00
38 lineal ft. 8x12 flue chimney, $1.25	47.50
14,700 brick laid in wall $13	191.10
Total excavating and masonry	$ 324.60

LUMBER BILL.

	Feet.
2 6x6x12 ft. sills	72
1 6x6x14 ft. sills	42
2 6x6x16 ft. sills	144
2 6x6x18 ft. sills	108
2 6x6x14 ft. posts	84
1 6x8x20 ft. girder	80
1 6x8x8 ft. girder	32
34 2x8x12 ft. first floor joists	544
4 2x8x14 ft. first floor joists	76
7 2x8x16 ft. first floor joists	147
5 2x8x10 ft. first floor joists	68
10 2x8x24 ft. second floor joists	320
14 2x8x16 ft. second floor joists	294
14 2x8x14 ft. second floor joists	266
24 2x4x14 ft. ceiling joists	216
12 2x4x16 ft. ceiling joists	132
14 2x4x18 ft. ceiling joists	168
20 2x4x12 ft. ceiling joists	160
120 2x4x18 ft. outside studs	1,440
28 2x4x18 ft. partitions	336
60 2x4x16 ft. partitions	660
30 2x4x16 ft. plates	330
30 2x4x12 ft. plates	240
14 2x6x18 ft. partitions	252
4 2x4x24 ft. hip rafters	64
6 2x4x18 ft. rafters	72
38 2x4x16 ft. rafters	418
30 2x4x12 ft. lookouts	240
10 2x4x12 ft. dormer	80
16 2x4x14 ft. porch ceiling	144
15 2x4x10 ft. porch rafters	98
20 1x4x16 ft. ribbons and bridging	107
30 1x6x12 ft. braces	180
Total feet framing lumber	7,614

7,614 ft. framing lumber, $26	$ 197.96
1,750 ft. 8-inch No. 2 lap for rough floors, $26	45.50
2,660 ft. 8-inch No. 2 lap for outside walls, $26	69.16
2,650 ft ½x4-inch siding, $32	84.80
500 lbs. tarred felt, $2	10.00
300 ft. 1x4x16 ft. flg., $45	13.50
250 ft. ⅝x4x14 ft. ceiling, $32	8.00
400 ft. ⅝x4x12 to 16 ft. ceiling, $32	12.80
400 lineal ft. 1x4 ft. finish, $45	6.00
240 lineal ft. 1x12 ft. finish, $45	10.80
200 lineal ft. 1x8 ft. finish, $45	6.00
60 lineal ft. 1x6 ft. finish, $45	1.35

20 lineal ft. 1x6 ft. com., $45	.45
2,000 lineal ft. 2¼ face V. G. flg., $45	90.00
6 1⅛x12x12 ft. finish, $45	4.05
1,600 ft. 1x6 No. 2 sheathing, $26	41.60
16M shingles, $4	64.00
Total lumber bill	$ 665.97

MILL WORK.

5 cellar window frames, 12x16, 2 light, $1.75	$ 8.75
5 cellar sash, 12x16, 2 lt. 1⅜, 90c	4.50
1 cellar door frame 2 ft. 8 in. x 6 ft. 8 in., rab. 1⅜ in.	2.25
1 cellar door 2 ft. 8 in. x 6 ft. 8 in. x 1⅜ in.	2.60
1 O. S. dr. frame 3 ft. 0 in. x 7 ft. 0 in., rab. 1¾ in.	2.50

*Materials are figured at Omaha prices. Carpenter labor figured at 40 cents an hour.

1 O. S. door frame, 2 ft. 8 in. x 6 ft. 8 in., rab. 1⅜ in.	2.25
1 win. frame, 40x40x16	2.50
1 triple sash frame, 24x20	5.25
4 sash frames, 36x24, $1.75	7.00
3 window frames, 24x28, $2.25	6.75
1 window frame, 12x18, $2	2.00
2 window frames, 20x20, $2	4.00
1 window frame, 28x24	2.25
5 window frames, 30x26, $2.25	11.25
2 window frames, 24x26, $2.25	4.50
1 window frame, 20x26	2.25
1 dormer twin sash frame, 24x18	3.00
1 window, 40x40x16	4.50
3 sash, 24x20, $1	3.00
4 sash, 36x24, $1.50	6.00
2 sash, 24x18, $1	2.00
3 windows, 24x28, $2	6.00
2 windows, 20x20, $1	2.00
1 window, 12x18	1.25
1 window, 28x24	2.00
5 windows, 30x26, $2.25	11.25
2 windows, 24x26, $2	4.00
1 window, 20x26	1.90
2 sets dr. jambs, 5 ft. 0 in. x 7 ft. 6 in., 90c	1.80
9 sets dr. jambs, 2 ft. 8 in. x 6 ft. 8 in., 70c	6.30
4 sets dr. jambs, 2 ft. 4 in. x 6 ft. 8 in., 65c	2.60
1 set dr. jambs, 2 ft. 0 in. x 6 ft. 8 in	.60
68 plinth blocks, 4c	2.72
12 casings, 7 ft. = 84 ft., 2c	1.68
56 casings, 6 ft. = 336 ft., 2c	6.72
32 casings, 5½ ft. = 176 ft., 2c	3.52
14 casings, 3 ft. = 42 ft., 2c	.84
270 ft. head casing, 2c	5.40
280 ft. cap mold, 2¼c	6.30
280 ft. fillet, ½c	1.40
96 ft. window stool, 2¼c	2.16
96 ft. apron, 2c	1.92
308 ft. window stops, 14 ft., ½c	1.54
252 ft. door stops, 14 ft., 1c	2.52
490 ft. base, 3c	14.70
490 ft. floor mold, ½c	2.45
170 ft. picture mold, 1½c	2.55
4 ⅝ in. x 4 in. x 3 ft. thresholds, 15c	.60
7 corner heads, 20c	1.40
Front stairs	65.00
3 turned porch col., 10x10x8 ft., $3	9.00
1 turned porch col., 8x8x8 ft.	2.50
1 piece porch rail, bot., 14 ft., 5c	.70
1 piece porch rail, top, 14 ft., 5c	.70
1 piece porch rail, bot., 16 ft., 5c	.80
1 piece porch rail, top, 16 ft., 5c	.80
112 balusters, 1¾x1¾x20 in., 4c	4.48
500 ft. lattice 5-16x1¾ in., 40c	2.00
200 ft. 4½-inch crown mold, 2c	4.00
90 ft. 3½-inch crown mold, 1½c	1.35
350 ft. 1¾-inch bed mold, 1c	3.50
144 ft. ⅞ quarter round, ½c	.72
60 ft. ⅞ cove, ½c	.30
100 ft. 2-inch watertable, 1c	1.00
Total mill work	$ 284.07

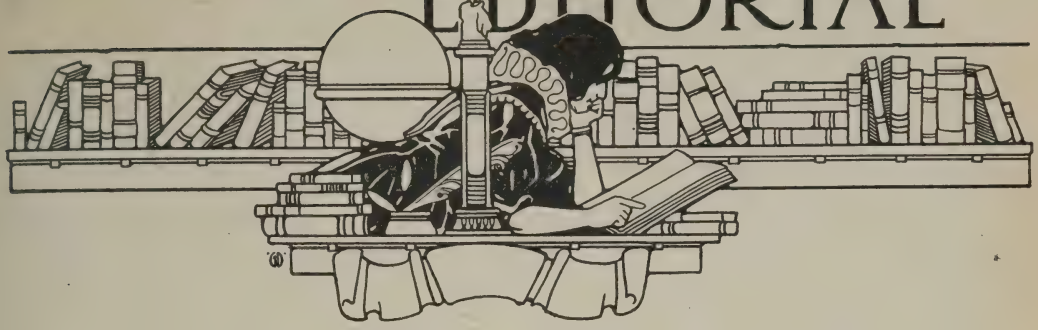
CARPENTER LABOR.

7,614 ft. framing lumber, $10	$ 76.14
4,410 ft. sheathing, $8.50	37.48
2,650 ft. siding, $1.40	37.10
950 ft. ceiling, $1.50	14.25
2,000 ft. flooring, $1.50	30.00
1,600 ft. roof sheathing, $8	12.80
16M shingles, $2	32.00
Work on dormer	12.00
Main cornice	16.00
Porch cornice	12.00
Rear porch cornice	6.00
Outside steps	5.00
Porch rail and balusters	14.00
Outside cellar way	6.00
Inside cellar stairs	6.00
Setting frames	8.00
Setting jambs	6.00
Finishing cellar frames	9.00
Finishing main windows	48.00
Finishing doors	58.00
490 ft. base, 5c	24.50
170 ft. picture mold, 1½c	2.55
Front stairs	25.00
Work on closets	7.00
Work on pantry	5.00
Total carpenter labor	$ 509.82

RECAPITULATION.

Excavating and masonry	$ 324.60
Lumber bill	665.97
Mill work	284.07
Carpenter labor	509.82
Hardware and nails	62.00
Tin work	48.00
Plastering, 685 yds., 28c	191.80
Plumbing	270.00
Electric wiring	45.00
Painting	150.00
Furnace	140.00
Incidentals, 5 per cent	134.56
Total estimate	$ 2,825.82

EDITORIAL



To abuse a man, or fling left-handed compliments at him because of his lack of knowledge regarding his trade, is simply worse than nonsense, and a waste of time and temper.

* * *

If you know of a better way to do a piece of work, and your fellow-workman is doing a similar piece of work by different methods to yours, show him your method; he may adopt yours and you may find something in his that is better than yours. Try this policy—it is worth your while.

* * *

Expert workmen are coming to this country from Great Britain in large numbers and this reduction of skilled workmen in that country, and the introduction of them here, is having an influence on the daily wage of the expert workman. The tendency is to raise the wage in Britain and lower it here. This state of affairs has emphasized the necessity of more technical and trade schools, in which more thorough courses of instruction, requiring no small amount of study and application to reach the proficiency required to secure a certificate.

* * *

As a contemporary says: "It is clearly recognized that while handicraft is important to the plumber in his everyday work, it is equally important that he should be a master of the theories and principles which underlie his work. He must also be conversant with mathematics and physics and the various rules to aid in solving the problems in his field. English workmen in America have commonly shown their learning in these fundamentals and a close familiarity with books pertaining to building. It is the long acknowledged falling off of candidates for the regular apprenticeship in this country and a similar appreciation of the value of the technology of trade that accounts for the large number of trade schools and manual training schools which are being established in different parts of the country. It seems clear to many that there is need for more of the technical training schools, and that without them it will be almost impossible in the near future to recruit the ranks of skilled workmen to meet the requirements of the times."

* * *

We wonder how many building firms there are in these United States that have been in existence for 100 years or more. We should like to know, and would feel obliged to readers of this journal who will send us the names and locations of any such firms or individuals who are still running the building business under the name or names of the party or parties who first established the business one hundred or more years ago. There are many old families in the New England States, in old New York, in the city of Albany, in New Jersey, Philadelphia, Pennsylvania, Trenton, Maryland, Delaware, New Orleans, and many other old settled districts, who may have relatives, near, or distant, whose forbears were in the building business, and who themselves still run it under the original name. There ought to be, and perhaps are, many old workshops in the country in unsuspected places, still bearing the names over the entrance of the original founders of the business. We would very much like to have, for publication, the names of these old workers, and whatever may be known of them, and appeal to those of our readers who may have knowledge of such,

to furnish us with whatever data they may gather in the matter. We will gladly pay the writer, for his or her contributions, at our regular rates.

* * *

We have been influenced in preparing the foregoing, by an editorial which appeared in The Building World—English—some time ago, a portion of which we reproduce as follows: "On the occasion of the coming-of-age, at Hitchin, of the son of Mr. Francis Newman, a builder, it was stated that the firm continued in the same family from 1728, a period of 184 years, and had been conducted by six generations. This, we believe, is unique in the building trade, and if our readers know of a case which proves the contrary, we should like to hear of it, for such are always interesting in a trade which is so uncertain. By reason of the varying nature of the work, it is also more difficult to find records of long service on the part of the workmen. We have known many years' service put in by one man, but it has been quite exceptional, although in other trades one hears of records and record-breaking, which is all to the credit of master and man. We know, for instance, of a case of over one hundred years' service put in by a father and his son in one firm, but it was not the building trade, but the very casual nature of its work is itself inimical to long records of business life or service in it, and is probably the only reason why it cannot show such records as other businesses."

* * *

The building codes, as made use of in any large city are generally found to be more or less defective, so much so in some cases, as to render the whole combination worse than useless, for we know from experience that defects in the codes are promptly taken advantage of by those who are interested in defeating the benevolent purposes of its framers. It is surely desirable that any proposed ordinance should be subjected to competent and searching criticism before it is placed on the statute books, for any defect will soon be discovered and twisted so as to inure to the personal interests of contractors or workmen employed on the construction. Some codes, says an expert, contain many extraordinary provisions which in their practical application are ludicrous. One example is the requirement that in such buildings as a noted hotel the windows of all the rooms occupied by the guests shall be of wire glass, thus preventing them from looking out of their windows. The most serious defect of this particular code is the extraordinary failure to meet adequately the need for proper open spaces for light and ventilation in various classes of buildings, notably office buildings, hotels, two family houses, private dwellings, factories, lofts, etc. The inadequacy of these provisions has been fully pointed out on behalf of the committee on the prevention of tuberculosis and need not be repeated beyond saying that not only are the provisions that have been formulated inadequate, but they would bring back in other classes of buildings the worst conditions which prevailed a quarter of a century ago.

* * *

Just now there is a movement on foot to induce municipal corporations and other bodies and individuals interested in the healthfulness, beauty and artistic arrangement of villages, towns and cities, to create and cultivate a desire for betterment along these lines, among the citizens in every municipality in the country. This is in the right direction, and if the movement is taken hold of heartily in those localities where new villages, towns, or cities, are being established, or have been established, much real good will follow; and instead of the toy-box appearance which is always in evidence in most of our villages and towns, there will be more picturesqueness and more harmony to greet the eye as one travels by rail, or by other means. Those who have traveled in Europe and particularly in England, can not have failed to notice the beautiful features of the quaintest layout of the greater number of the hamlets and villages of the countryside, and a fair acquaintance with the highways and byways of English counties is sure to convince that a little art and intelligent thought in designing—or even in making changes—of a town or village, will make for the beauty and picturesqueness of the place, and will give it a much greater artistic value than it could possibly obtain under the present straight line formal method of planning.

* * *

Trees, such as elm, oak, ash, chestnut, willow and many others, when properly arranged, add much to the beauty of the scheme and make the whole landscape attractive and.

delightful to look upon. Skill and scholarly discrimination are necessarily required in the selection and arranging of trees, and regularity should be in all cases avoided. Of course, extremes in this rule, as in other matters, is not permissible, either in arrangement or in the kind of trees made use of, unless in avenues or parks. In these days of rapid traveling vehicles, it is wise to avoid crossing roads at right angles where possible, and if a clear space near the junction of the roads can be provided and made use of as open to all roads at the junction, it will be in the interest of safety and speed. In the arrangement of houses, and style of buildings in growing towns and villages, a great deal can be done without additional cost to owners of the cottages, if the matter is wisely and carefully handled. There are so many things that may be bettered in town planning if proper steps are taken and public opinion brought to take interest in it, that we feel it will be our duty to take up the subject again in a future issue.

* * *

The New York Fire Exposition, which will be held in Madison Square Garden from October 2d to October 12th, is a long step toward cutting down the greatest national disgrace, the annual fire loss. The delegates appointed by the various cities will return to their homes with real enthusiasm on the subject of prevention of fires and the suggestions which the speakers make will be widely distributed by those best able to advise builders and owners, and to instruct firemen and others regarding the best methods of extinguishing fires that get a start.

Statistics are of great value to the scientific mind, but they do not command respect any more than the sign boards advising caution at the railroad crossing. There must be a real awakening of those indirectly interested, as well as the owners of buildings and their contents, before there can be a noticeable effect.

Only the criminal will intentionally start a fire, for his own personal gain, at the cost and risk of others. Yet there are many instance where construction almost invites disaster, and carelessness in the use of matches, gasoline, oils and other inflammable substances causes many fires. Spontaneous combustion is the result of negligence amounting almost to criminality.

The exposition will deal with these subjects, and the effects will, we trust, be beneficial and wide-reaching.

The Beneficial Sleeping Porch

Can Be Provided Far Better When the House Is Planned Than Added Afterward—Points to Be Borne in Mind When Planning It.

IN VIEW of the fact that no substitute for fresh air has yet been found, it is inevitable that those who go from ill-ventilated stores and factories to homes whose air is usually as impure and insufficient will, even if naturally strong, become open to the attacks of pneumonia and tuberculosis.

The open-air sleeping porch, or balcony, is the up-to-date solution of the important problem of providing the best conditions for our hours of nightly rest.

Built adjoining the bed-room, the sleeping-porch gives its occupant all the benefits of sleeping out-of-doors, and the former room for a comfortable dressing-room, the temperature of which, during winter months, need not be lowered by open windows.

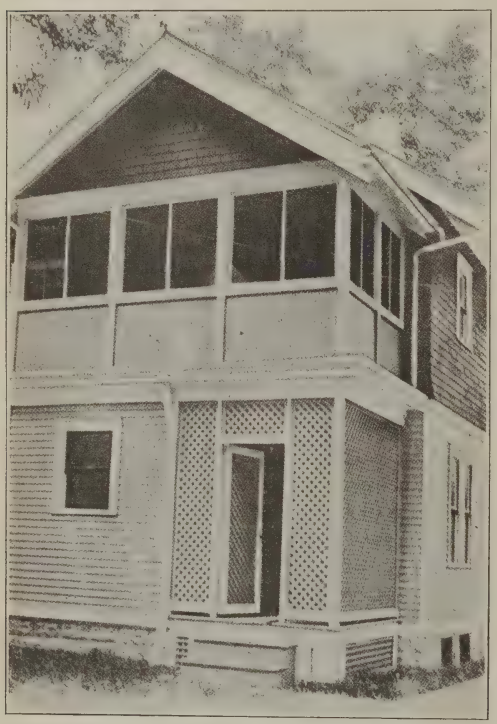
Originally devised as an adjunct to the cure of tuberculosis, the sleeping-porch is fast outgrowing this limited use, for it is being recognized as of almost incalculable value in maintaining health. It is not, in any sense, a "cure-all," but a preventative. The effects of being able to breathe deeply of nature's vitalizing element in unlimited quantity, during the hours when the body is recuperating from the day's work, cannot be other than beneficial.

If the sleeping-room habit is held to (and when thoroughly tried, it usually is) its devotee cannot fail to reap the rich reward of increased efficiency and keener enjoyment of life.

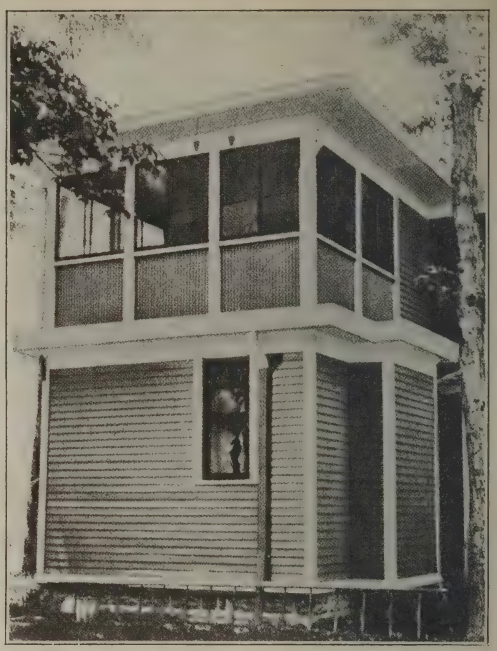
For those of low vitality and a tendency toward the "blues," which are often found together, sleeping in the open air frequently does wonders. It is readily seen that growing children are greatly benefited by the change from the indoor bedroom to the sleeping-porch.

The photographs show some different ways in which the sleeping-porch can be

added to the home. With respect to the arrangement of the porch itself and the structural details, it may be well to say a few words. The points to keep in mind are the protection of the occupant from inclement weather, his comfort, and a free circulation of air at all times. To exclude rain or snow, the roof of the sleeping-porch should not only be substantially built, but should have a wide overhang. The sides of the porch may be solidly inclosed to a height of two or three feet, with screened openings above, or left entirely open except for screening, which is always desirable. Heavy canvas curtains, set to roll from the bottom, will keep out storm and insure privacy. When the occupant has retired, these can be lowered by a simple adjustable cord and pulley



device. When the porch is of the extra size of some shown in the pictures, glass sash, which may be fitted for winter use, provides a cheerful sun-parlor for the daytime. If such use is intended, an extension of the heating-system is advisable when practicable. The sun will give sufficient warmth in fair weather, but when winter storms abound, artificial heat generally proves a necessity for comfort.



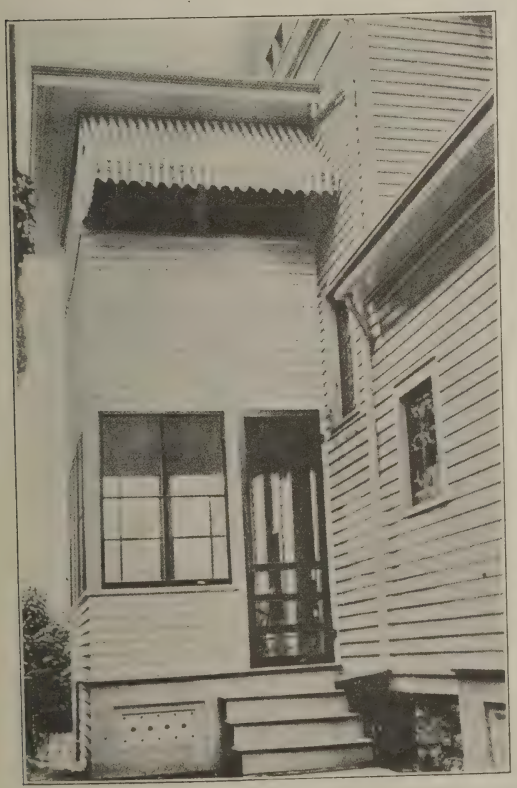
Electric wiring of the sleeping porch is easily arranged, and has the further advantage of making possible the use of an electric heating pad, to warm the bed in cold weather.

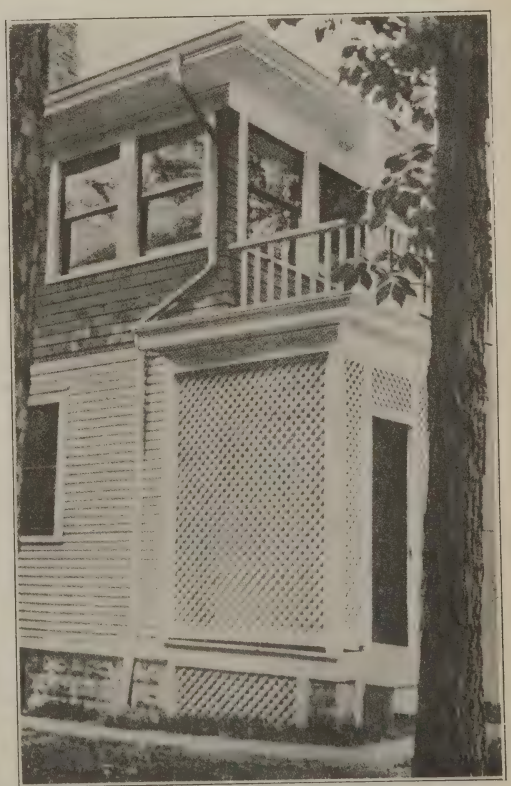
It should be remembered that everything needed to make the occupant comfortable is desirable. The bed should be thoroughly warmed before retiring, by heating pad, hot water bottles, or other means, whenever necessary, for the beneficial effects of sleeping out can be nullified, and even injury done, by making it in any way a test of physical endurance.

The penetration of cold through the mattress from beneath, which is a source of discomfort, can be largely prevented by laying one or more thicknesses of paper between it and the springs. As undue weight of bedding prevents restful sleep, care should be taken, in severe weather, to provide only such as is both light and warm.

Only those who know from experience, realize how refreshing is the sleeping porch during the hot summer nights.

The accompanying pictures show some of the sleeping porches planned and built by City and Suburban Building Company of Fort Wayne, Ind. These pictures show the various ways in which sleeping porches can be provided when the house is planned.





Heating of the Modern Building*

By CHARLES F. SMITH, Consulting Engineer.

HEATING of the domicile for personal comfort has for many ages received more or less attention from mankind; but it is a matter receiving greater attention today than ever before. Many able engineers devote their entire time and attention to the preparation of plans for the proper heating of various classes of buildings; there are many manufacturers doing an excellent business in the manufacture and sale of heating appliances exclusively, and many firms engaged in the installation of the heating equipment for the building.

At the same time many mistakes are made in the design and installation, many buildings are overheated, and still more are insufficiently heated; many installations are improperly designed or erected, thus causing constant annoyance and loss in efficiency.

Although heating and ventilating of the modern building has become almost an exact science, there is no other branch of engineering work, in which success depends so much upon good judgment, based on knowledge and experience; and yet in spite of this indisputable fact, and the very numerous failures scattered around, an engineer is not always, nor often consulted, even on large buildings; many architects, having in their employ a draftsman with some general knowledge of the rudiments of heating, and two or three manufacturer's catalogues on their shelves, often attempt the design of heating installations for their buildings, usually with poor results; but as it generally requires one to two years to try out the heating plant, and the architect is likely to consider it merely incidental in the design of the house, and pay no further attention to it after the house is completed, he never knows the results of his versatile draftsman's efforts; more frequently, however, the architect merely turns over the design of the heating and lighting installations to favored contractors, and incorporates their plans and specifications with his own. That policy carried to a logical conclusion would deprive the architect, as well as the engineer, of his fee, as the owner need only commission a general contractor to prepare the plans and construct the building, without the intervention of the architect at all; in fact that is done in many cases, though it is a very poor plan to follow, as there is then no one with knowledge of the required conditions to check the contractor, and it is natural enough that he should consider his own interests first, before those of the owner. An architect is first of all, an artist, and if competent, has quite enough to do in the study and practice of his own profession, without assuming specific knowledge of all branches of engineering, each one of which requires as much careful study and practical experience to assure success, as does the profession of architecture.

An architect, if engaged in a legal contest, would very properly feel much aggrieved if he should discover that his side of the case had been prepared for presentation to the court by his opponents' attorney, at the request of his own lawyer; yet, that is practically the condition that exists when the architect permits a contractor to prepare any of his plans and specifications, without the full knowledge and consent of his client. There are many factors to be considered in the design of a heating plant, and no two cases are alike in all respects; there may be a difference in extent of glass, or exposed wall surface, or in cubic contents, and in method of heating, in fact there are as many differences as there are buildings to be heated, and each case requires specific knowledge, careful consideration and long experience to secure the best results.

The fees of a competent engineer are not excessive, and it is certainly far more satisfactory to all concerned—owner, architect and contractor, to have an engineer prepare the plans and specifications for the engineering work of a building, than to have the architect, or an interested contractor attempt to do so, with more or less unfortunate results. It is impossible in this series of brief articles, to give full instructions regarding the design and installation of all classes of heating and lighting equipment. Sufficient information, however, can be imparted, to enable anyone to complete these installations in a home of say, six to ten rooms, in a satisfactory manner.

The original method of artificial heating

*In three previous articles, Mr. Smith described the Sanitary Equipment of the Modern Home.

for the benefit of mankind, was by the open wood fire, around which he and his kin could gather for such comfort as might be abtained by toasting one side, while freezing the other side of his anatomy; it was the most inefficient method ever practiced, and was followed by the other extreme of bringing the fire inside the hut, or tent, when the proficiency of man had reached the stage of constructing a domicile for his own use. From a purely heating standpoint, this was the most efficient method ever introduced, as full advantage was taken of the heat of combustion, as well as of radiation, and this method is still practiced by many uncivilized, or semi-civilized people; but from a ventilating standpoint, it would be difficult, if not impossible, to devise anything worse, as the heat and smoke of the fire was permitted to escape as best it could, through a small hole in the roof, or through the door opening.

From that stage we drifted to the open fireplace; what was the open fire, now enclosed on all but one side, provision being made for the escape of the gases and smoke through a chimney of brick or stone. This is far better for ventilation than previous methods, but is the most inefficient of the civilized methods of heating, as all the heat of combustion and convection is discharged into the atmosphere through the chimney, and the heating of the room is effected entirely by the heat of radiation, but as radiant heat travels entirely in straight lines, and its effect is in inverse ratio to the square of the distance from its source, it follows that only such portions of the room are heated, as come within direct line of the fire and the more distant parts of the room are unheated, and further any obstacle interposed between the fire and the wall, shuts off the heat from that part of the room beyond the obstacle, whether it be an individual, chair, table, or what not. The only advantage this method of heating possesses over former methods, is improved ventilation, as the fire draws air to combustion, through the doors and windows, and even by seepage through the walls; but this cold air passing through the room and over the floor, causes chilly, uncomfortable drafts. As an aid in ventilation, but largely for esthetic reasons, the fireplace is frequently introduced into the present-day house.

Our next step was the individual stove in each room, from a heating standpoint, probably the most efficient of our modern methods, as the heating is effected by radiation and convection. The stove being placed away from the wall, radiates heat in all directions, and by causing a circulation of the cooler from the floor over the surface of the stove, transmits heat by convection; that is to say, the air in passing over the heated surface wipes off, or absorbs heat, much as a sponge absorbs water; exactly the same thing occurs with a steam or hot water radiator. The objections to the stove are: the constant care required for feeding and cleaning; the greater amount of fuel needed for the increased number of fires; more dirt and ashes in the house, and the lack of adequate ventilation, as the small amount of fresh air drawn in by the fire is used to support combustion.

The next stage in our heating progress, is the furnace, placed in the cellar, or basement, and consisting of a fire box of circular shape for coal, and rectangular for wood, surrounded by an air chamber fitted with outlets at the top to supply heated air to the different rooms, and supplied with fresh air from outside by a special duct opening into the lower part of it. This system provides heat and ventilation, and is more satisfactory, and generally speaking more efficient than any of the previous methods. The objections are, the difficulty of getting the air where wanted, and when wanted, and the liability of gas escaping from a leaky firebox into the air chamber, thus poisoning the air supply for all the rooms. The best method of all, is to force the air where wanted by the aid of a fan, but the expense makes that plan prohibitive for any but large installations; we are therefore, left with the steam, or hot-water radiator, as the most satisfactory and efficient method of heating; ventilation can also be provided, if the radiators are used as indirect or direct indirect, and by vent ducts.

Many people are possessed with the idea that the air in a room heated by a steam radiator feels dryer and more "stuffy" than when heated by hot water, or any other method; this is an erroneous impression, and is due very likely to the higher temperature of the steam, and the fact that in practically all small installations, each radiator is provided with an air valve which permits the air from the steam radiator to escape into the

room while with the hot-water system, the air is more likely to rise to the expansion tank; but if the radiators are of the proper size, the temperature of the room will be just the same, whether heated by hot water or steam.

There is one important fact to be considered in the heating of a building, that is very frequently lost sight of, and that is the capacity of air at different temperatures for retaining moisture. In a moist climate we feel comfortable at a lower temperature; as in England, for instance, where the standard room temperature is 59 degrees F. because there is less evaporation from the body, while in a dry climate, or in a heated room, where no additional moisture has been provided, there is increased evaporation from the body, and we may feel uncomfortably cold, even with a room temperature of 75 degrees, and the throat and nostrils feel dry and parched.

This is one good reason why the air in a room heated by a water or steam radiator feels dryer than in one heated by a furnace; with the furnace, fresh air is being constantly admitted, carrying oxygen and additional moisture, while with the radiator, on the contrary, the air is reheated, time after time, the oxygen is consumed, and the moisture absorbed, and yet the capacity of the air for moisture has been greatly increased; consequently it is always advisable to provide some means of supplying additional moisture when designing a steam or hot-water heating plant.

There are several factors to be considered when planning the heating of a building. among them are: the location and construction of the building; the lowest temperature to be expected in that locality, as our calculations are based on that temperature; the exposure of the rooms, whether north, south, east or west; the extent of exposed wall and glass surface, the cubic contents of the room, the temperature desired in the room, and the number of air changes per hour.

It is necessary to know the quantity of heat to be provided in British thermal units, or b. t. u.s as it is called; a British thermal unit is the quantity of heat required to raise the temperature of one pound of pure water one degree, at its point of greatest density, that is, from 39° to 40°.

There are a variety of "short cut" methods, in use by different parties, for deciding on the amount of heat required, but not any of them are reliable; the only safe plan is to make the necessary calculations, and it takes but little more time.

In our next issue we will begin the calculations and design of the heating plant of a typical modern house, starting with the furnace equipment.

Some Problems of the Jobbing Carpenter

By WM. C. A. STEVENSON

THE jobbing carpenter is brought face to face with so many complex problems that it is difficult to decide which one required the most thought. In my last article I treated the subject of making contracts. I will now endeavor to indulge the reader with a few hints that may serve to show how to stop many of the leak holes that cause losses. I will not claim to be able to point them all out, but only those which have come directly to my notice. I will treat from my own experience and hope they may benefit some fellow reader, and perhaps draw out the practical experience of other readers as well.

PROFIT AND LOSS OF THE BUSINESS.

When a carpenter enters the jobbing or contracting field, he, without question, does so to make more money than he could by working for someone else (unless he is like the old colored man who figured it was worth 50 cents a day to be the boss). It is, however, a regrettable fact that many good mechancs fail when working for themselves. The whole thing revolves itself around the one word MANAGEMENT.

It cannot always be said when you have completed a contract and find you have come out on the loss side of the ledger that you have taken the work too cheap, for another man might have taken it at the same figure and made a good fair margin of profit. In the majority of cases it will be found that it was a case of mis-management. The old proverb, "Plan your work, then work your plan," applies just as much to the jobbing carpenter as to any other trade or business. I will now ask my readers to follow me and see if we cannot point out at least a few of the leak holes of the business that go to spell mismanagement.

First: I will ask you to review my article in the June number on the system for keeping account of the cost on jobs. It is very important that you know just what each job has cost you, else how are you to know where you have lost?

Second: Make sure you have everything ready. Have materials on hand or be sure they will be delivered when wanted, before you place your men on the job. Every minute's time your men spend in waiting for supplies you must pay for; this cuts into your profit and means a leak hole in the business.

Third: Make sure your tools are in proper working condition. Never try to do a job that you have not the proper equipment to handle. If you do not possess it yourself and are not able to buy it, try and hire it. For instance, if you have a job that requires, say, 20 jack screws and you only have 6, do not try to get along with that 6; the extra work in setting, resetting, shoring, etc., will many times over balance the slight cost of hiring the extra screws required. The same applies to every other place where any equipment whatsoever is required. See that the workman's tools are in good working order; better to pay a man for the time required to put them in shape than to allow him to try to work with dull tools; he cannot make proper headway or do good work unless his tools are in shape. This will stop another leak hole in the business.

Fourth: Make sure you know just what is to be done and how you are going to do it before starting. Here is another advantage of having proper plans and details for the work. Keep your work laid out ahead of the men so that they do not have to wait while you figure out what is to be done. It is your loss if you do and another leak hole of the business.

Fifth: Make sure you do not have to do work over the second time at your expense. Have a clear and definite understanding and a contract as pointed out in my last article. Mistakes are very costly; better spend a little more of your own time on laying out and be sure you are right before you proceed. This corks another leak hole in the business.

Sixth: Make sure you are not paying too high for your supplies. If your competitor is buying supplies cheaper than you, you are working at a big disadvantage. Very often a two-cent stamp spent in an inquiry for a price on something advertised in The National Builder that you are using will get you a better price on something you want and stop another leak hole in your business.

Seventh: Make sure your help is working to your advantage, and not to just get in their time. Make your men feel they are a part of your business. It is true that leaders of men are to a large extent born and not trained, for some foremen will get twice as much work done as others and yet keep his men feeling perfectly contented. If one will just take the trouble to give this matter a little thought, he can learn to promote harmony and get far better results. This can never be accomplished by driving men like slaves. A little kindness will do more than a lot of cursing. If a man makes a mistake he will feel bad enough about it, without you making a large noise, if he is a man and respects you as he should and will if receiving proper treatment at your hands. You must keep the respect of your men in order to get the best results. When you find a man is not doing his duty, it will be to your interest to pay him off and let him go without any noise.

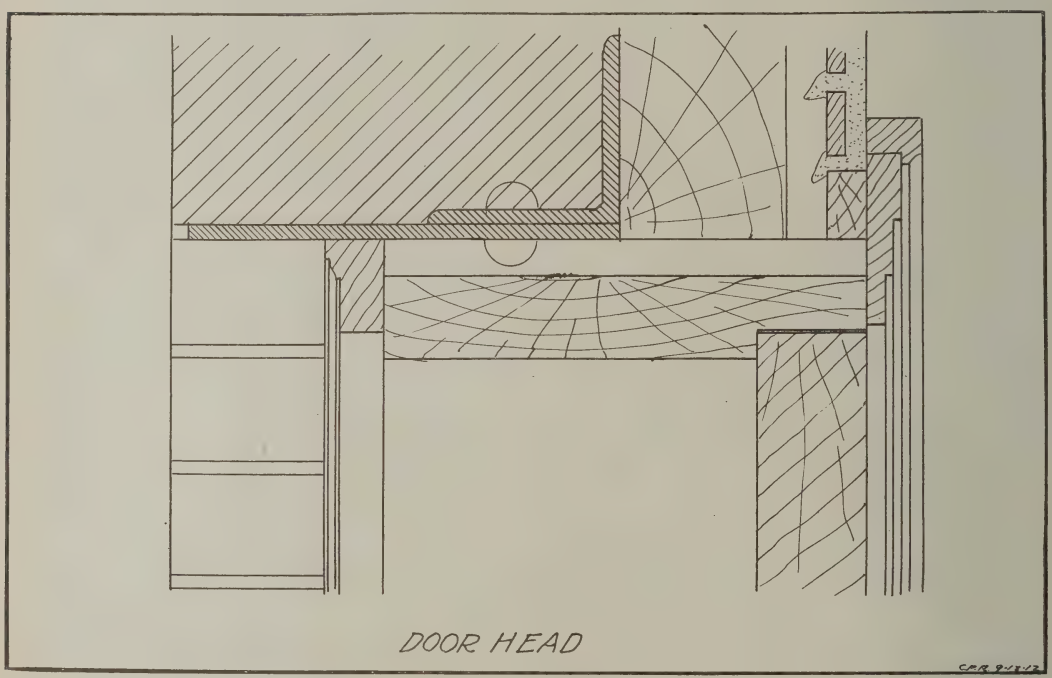
The handling of your help is one of the most important factors in the business. Many men are good buyers of supplies and good account keepers and all that goes to make up a success but fail on the help end. Their work costs them too much to get it done. I do not mean to say that they pay too high wages; on the other hand, I am in favor of paying the top notch scale of wages, but hire only the very best mechanics; then, as I have said before, keep your work laid out well ahead of the men so that no time will be lost. If the proper attention is paid to this end of the business a very large leak hole can be stopped.

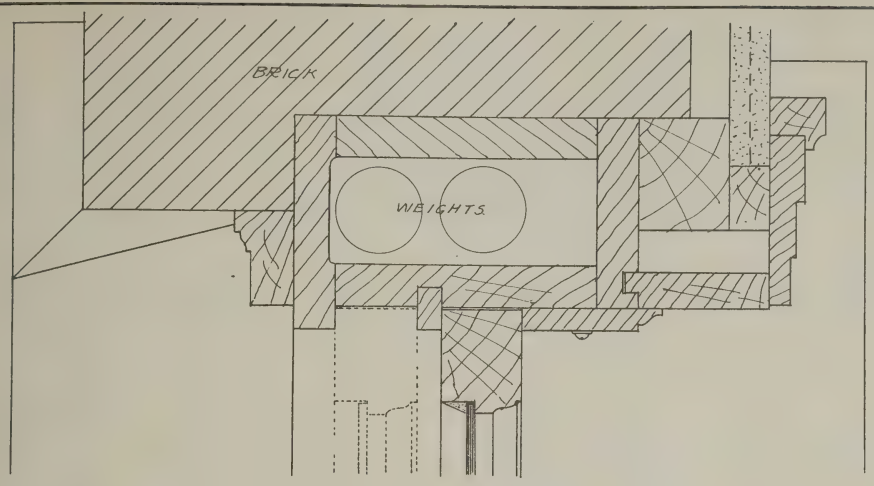
Eighth: Build your business on a solid foundation. The best way to do so is to not do your work too cheap. When you cannot get a price so that you can afford to do a good job, better not have it at all. Build up a reputation for doing reliable work and with the better class of people you will get the favor even if your price is a little higher. Do not make promises that you do not or cannot fulfill. Teach people to know you as a man who can be depended upon. A good reputation for honesty and ability is one of the best assets of the jobbing carpenter and goes a long way towards helping him to stop leak holes in his business.

Windows and Doors in Brick Walls

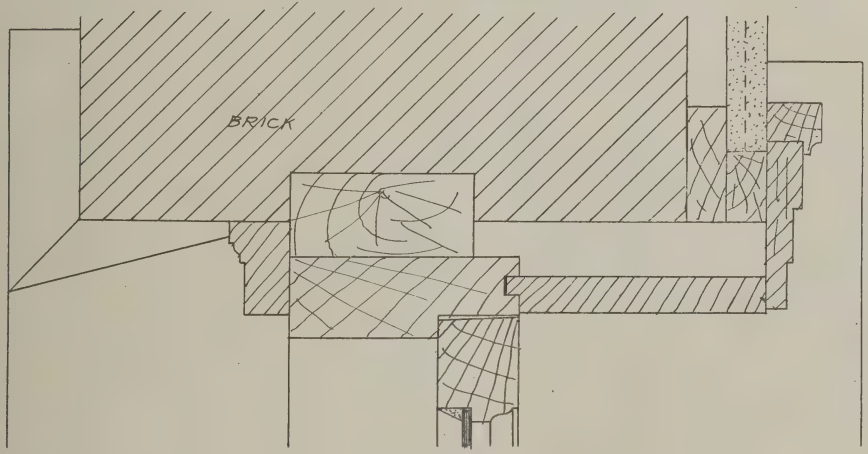
By CHARLES P. RAWSON, Architect.

THE drawings, this month, illustrate the construction of window and door frames in a thirteen-inch brick wall, the heads in all cases being square on top and carried by a lintel made of a 9-inch by ⅜-inch plate and a 4-inch by 4-inch angle. There is also a wood lintel, 4-inch by 6-inch in size, which gives an additional ground for nailing purposes. Each lintel should have a bearing of at least four inches on the wall at each end. The wall is furred on the inside and then lathed and plastered as shown, grounds being provided to receive the plaster. The furring and lathing may be omitted if the wall has been thoroughly waterproofed with one of the many preparations now on the market. The omission of the furring would make a slight difference in the construction of the frame. The space between the frame and the brick work at top, bottom and sides should be caulked with oakum before the staff bead or brick mould is finally secured in place. This mould is so arranged as to accommodate screens. In the casement window the sash swings inward so that the screen may be fixed. The wooden window sill should lap over the stone sill several inches, and the space between thoroughly caulked. Sometimes a tight joint is made by using a metal bar or tongue which is let into a slot on the under side of the wood sill and lead caulked into a corresponding slot in the stone sill. The stone sill is cut with wash and lugs on top and a water drip on the lower edge. The door jambs should be anchored back into the brickwork. A wooden threshold is usually provided to cover the joint between the stone sill and the adjoining floor. The sash shown are all one and three-quarters of an inch in thickness and all stops are secured in place with screws. A complete weight box should be provided for double hung windows in brick walls. The sub jambs, stools, etc., are so arranged that they may be of any desired wood for finish as none of the rougher part of the frame shows when the finish is in place. The drawings show complete sections through the sill, jamb and head of double hung window, casement window, and door and in the case of the former, the meeting rail is added. All drawings are made to the scale of one-fourth inch equals one inch or one-fourth full size.

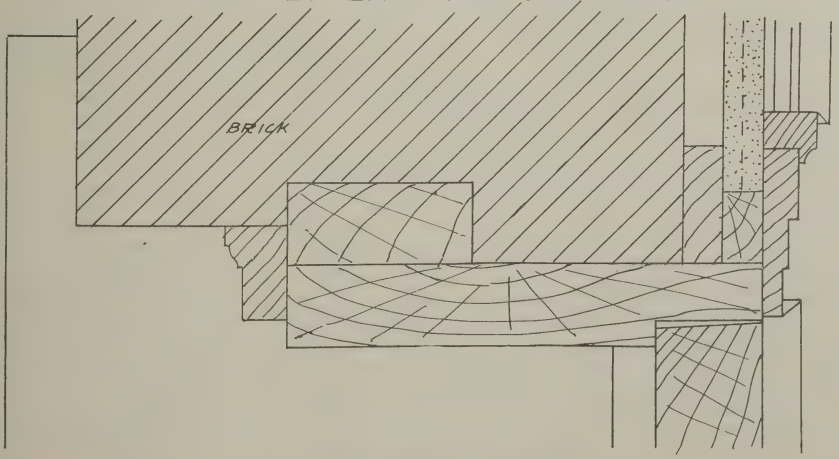




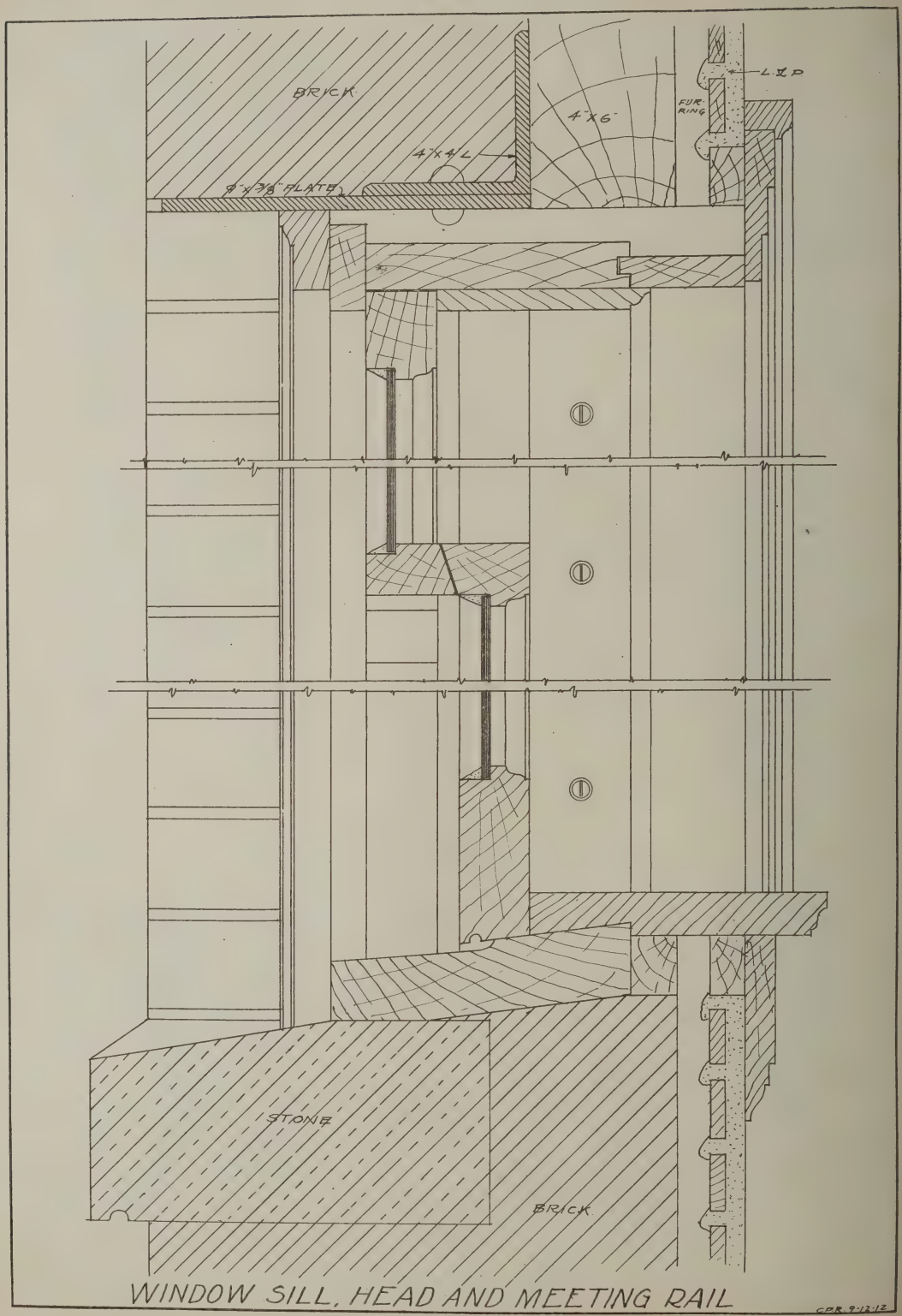
WINDOW JAMB



CASEMENT WINDOW JAMB

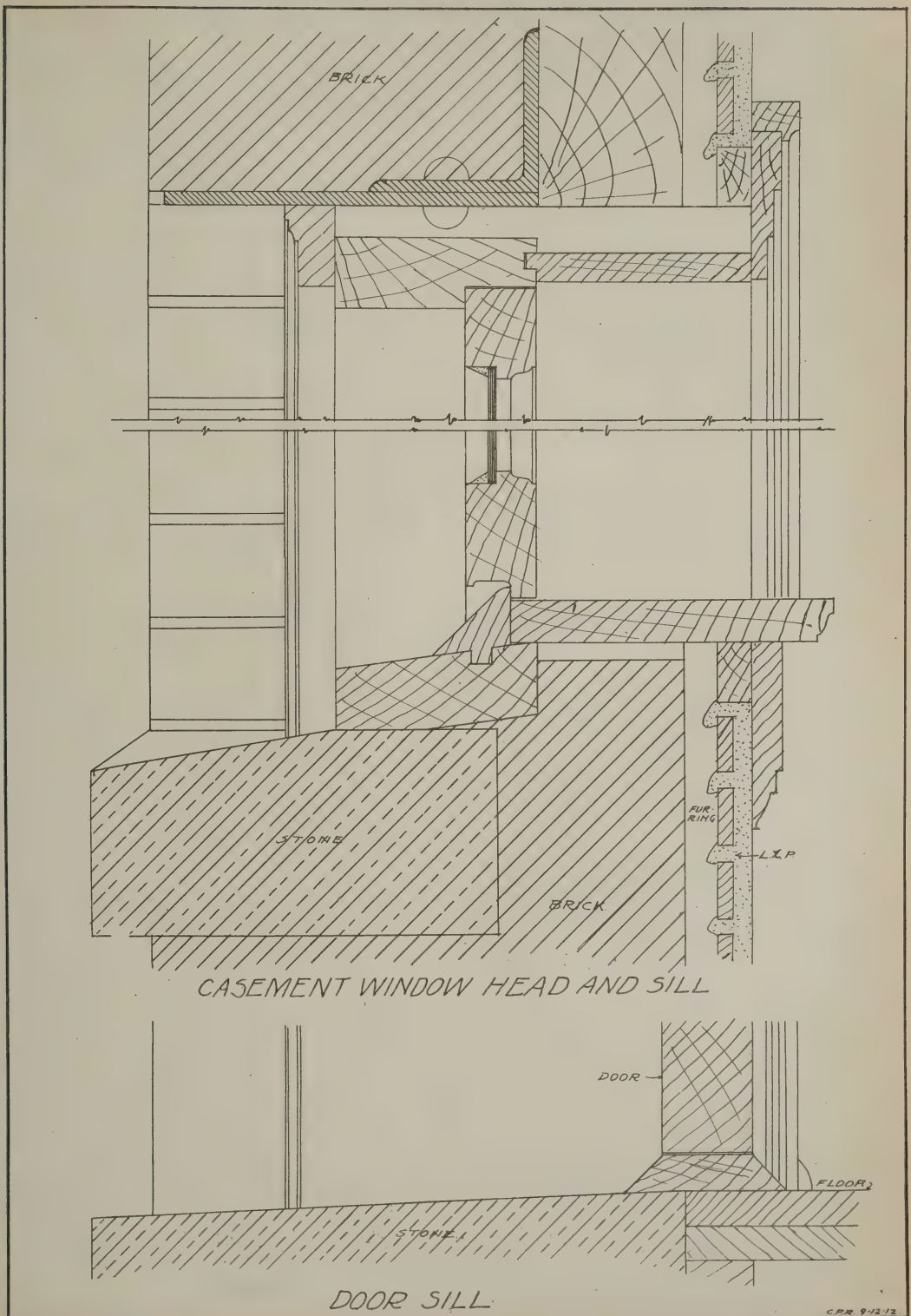


DOOR JAMB



WINDOW SILL, HEAD AND MEETING RAIL

GPR 9-12-12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How to Keep Busy in Winter

SOME months ago the NATIONAL BUILDER offered a prize for the best article on "How to Keep Busy During the Winter Months." The number of replies received indicated that it was a problem which many of our readers had already considered and solved for themselves. Some of the answers have already been published and we now publish several more on the same subject. It will be noted that nearly all of them consider a shop as being vitally essential and that some form of woodworking machinery is a great advantage. Above all, however, is the ingenuity displayed by the various workmen in bringing their trade to the attention of their friends and neighbors so that in the ordinarily dull months of winter these people will bring work to them.

What these men have done, every carpenter can do, but it means careful attention to small orders and frequently small jobs which would not be considered during the busy months. Just how much this trade can be encouraged is a matter for individual advertising. Each neighborhood has its varying problems and the man on the ground must meet the conditions as they are and must go after the work in a different way from his fellow workman in another part of the country.

Our subscribers in the south and the extreme west apparently do not feel the winter season as do those in the north and east. To them the busy season lasts practically the year 'round, so that there is no necessity for drumming up work for any particular season. It is well, however, to keep in mind the fact that there are quiet times everywhere and that sooner or later the busiest carpenter will have occasion to look for something to do. At such times the experiences of our subscribers are of great value as it shows how they overcome similar difficulties.

Keeping Busy in Winter

By JOHN UPTON

YEARS ago the carpenters were busy most all winter. Then the lumber was all in the rough and had to be planed by hand. Doors, sash and blinds were made by hand, also all frames, casings and trim, both inside and outside. In some cases the flooring was made by hand.

But times and conditions have changed and now there is not much of such work to be done. One way that some of us manage to keep busy is by having an inside job, such as finishing up the interior of a house, but the great trouble with this plan is that the owner quite often wishes to get moved into the new house before winter sets in.

Of course a man can buy a lot and build a house for himself either to hire, rent or sell, and then he may do the work when he wishes. For some of us this idea is all right, while for others it will not do. Sometimes we are working for a man who is willing that we shall leave the interior work until winter, but this is the exception rather than the rule, and there is more likely than not to be a limit set to the time for completing the work.

There are sometimes small odd jobs that can well be done in moderate weather, such as building or repairing porches, sheds for machinery, small buildings, such as garages, poultry houses, or perhaps a shop for oneself. One who has a shop will find considerable work to do in various lines both for himself and others.

He may not wish to go back to the task of building doors and sash by hand, though a well-made door is not to be despised even now, and often you can build storm doors, cash for your neighbors, and make good wages, and one can make the window frames for such buildings as he is to erect in the coming season. He can glaze and prime the sash and fit each to its frame. To make the frames he can get wide boards and rip them into the required width and save a little in this way. Door jambs can be put together ready for use. Stairs, cupboards, shelves built in bookcases, wainscoting, can be made ready and often given a coat of paint. Cellar window frames may be built, the sash fitted and all painted, as there is more uniformity in the size of these than of other windows, and one can well keep quite a supply on hand.

There are some things which most of us need for our own use, as saw horses, staging

horses, staging brackets and ladders. These can be built, repaired or painted. Perhaps you need a work bench to take out on jobs or would like a new tool chest and you can build these in winter.

Some of us have a suitable place and can build some articles of furniture for ourselves and others. A man who turns out good work can do quite a business in this. It may pay to build ladders, wheel barrows, hay racks, wagon boxes, or similar articles for sale.

Going back a step, if one can get a good chance to cut some timber and logs to be sawn up into lumber he can make good wages whether the product be rough lumber or fine hardwood finish or flooring. Then there are the saws to file and fit, other tools to sharpen for ourselves and others.

Now, let us look at the other side of the question. Do we really want to keep busy all winter? In these days of work and hustle a workman is supposed to do about twice as much in a day as he did years ago and his wages are considerably larger than then. In order to do what is required of him he must know more about his work than formerly and would it not be well for him to spend some time in studying about it? I think we should have a few good books on plans, estimating, methods of work, drawing, and other subjects relating to our business, and should take time to study them. We should be able to prepare plans and estimates for others and should keep busy during the active season and so earn the right to take life easier in winter.

How to Keep Busy in Winter

By BEN JOHNSON

I WILL tell you how to keep busy and some of the things I do while I am busy.

I have a work shop with a stove in it on my lot at home. I can work all kinds of weather in my shop, where I have tools to do most any kind of work that comes my way. I make it a rule to make or repair anything the people want. Here is a list of some of the things I do and have done: I repair all kinds of furniture and varnish some also. I have a pretty fair trade in this line for the winter months. I make screens of all kinds, hot bed sash for the gardeners, skirt boxes for the ladies, folding ironing boards, folding clothes driers, sometimes a flour chest, do clock shelves, book shelves, window seats, folding tables, small cabinets, or a nest of drawers for some special purpose, towel rollers, door steps, lattice for porches, repair washing machines, window and door frames, have made wagon beds and hay frames for wagons, frames for grind stones, and I once made a new frame, including all the wood work for a pile driver for the road commissioners.

You can see there is nothing too large or too small for me to undertake. It is very seldom I am out of work. I go to the houses and set window glasses, repair the door locks, do saw filing, put in new sash cord, sometimes I have a store room to remodel for a new occupant. I quite often have some outside work on hand and when we have some nice days to work outside I get out on these jobs, but when the weather is cold and stormy I let the outside jobs rest. It would be hard for me to name the many, many things I have made and repaired during the winter months.

I do not bother with much of this class of work after the spring work begins. I have some customers who save such repair work until I begin work in the shop. I have been in this town over fifteen years and am pretty well known, therefore I do not have to look for work. The people look for me.

Of course, one not so well known would have to drum up trade and let the people know what he is capable of doing. After he has a good business established, the work will come in fast enough most of the time. To make a success of the business, as well as any other in the carpenter line, he should be a good workman. He should be honest and when people learn that he can be depended upon he will have no cause to complain of having nothing to do.

He should be quick to see into things, for some will want a thing made, telling you what it is to be used for, than ask if you can make it. Of course you can, and you will need to be something of an inventor as well as a mechanic. You should be able to see things in your mind before they are begun, as well as with your eyes after it is done. If

he is a good draftsman, so much the better—it comes in pretty handy. Now, a man doing this class of work will have jobs come in which he will not like to do, but they must be done or he may lose a better one some other time. He should be ready to do anything the people want, if it can be done, and they are willing to pay for it.

You can see how all furnishes employment, and will bring in quite a bit of cash during the bad weather. It is much better than holding down a dry goods box up town.

The winter will soon pass; time does not drag so when we are busy. You will be toughened for work and will be ready for the spring opening.

Try it, brother carpenters, and be convinced.

How to Keep Busy in Winter

By E. E. SPICHER.

THE long cold winter months when there is little or no work and the expense of living still going on, perhaps increased, may be to some of us a very serious question. But I have often said that any man who really wants to work need not be idle. You know the Bible says, "God helps them that help themselves," and surely this applies to us in our vocation as much as to other men in their walks of life.

But we must lay our plans and make some arrangements for the cold winter months when outside work, to any great extent, is almost out of the question. Perhaps some of us could so arrange our work as to have some houses ready to finish inside when cold weather sets in, and then if they are supplied with heating plants, you could want no nicer job than putting on the inside finish. Then, too, it has been my experience that often during the busy season little odd jobs turn up and some of these are often inside repairs. Now, some of these patrons, if you talk the matter over with them, might be persuaded to wait until the busy season is over and cold weather has set in, and then, if you have a shop you could get the work ready in the shop and take it out and set it up, much to your own convenience and that of your employer.

These things, however, cannot always be arranged by all of us and when cold weather comes we find our work all done and no prospects of any more building until spring. Now, what is to be done? Have you a shop? If you have, you should be able to find something to do. Perhaps you have some houses to build in the spring. Why not buy some surfaced lumber and make the door and window frames. I always found that I could make good wages making frames. I have often made them on the job for whole houses and saved money by it. Of course, if you have the room you should have a hand power ripsaw, or, still better, one of the late combination machines equipped with a gasoline engine. The one I have I made myself some years ago, during the winter, when there was not much else to do. Of course, it is a little crude, but it answers the purpose remarkably well and saves a great deal of labor. To make frames I joint one edge of the lumber straight and true and then run it through the saw with the straight side to the guide, and there you are already sized. All I need to do is to take off a shaving with a foreframe to remove the saw marks. You will be surprised to see in how short a time you can get a lot of jambs or facings, and then with your machine you can rip up the waste into stops and parting beads to great advantage.

If there is nothing else, you might be able to make some furniture. I have made a piece of furniture, for which I had no order at the time, and always found sale for it without any trouble. Of course, you must not expect to make good wages at this business, but I prefer it to idleness, and then it is very nice work, affording excellent training in joinery. If you do good work, it will help you to acquire a reputation that will get you many a nice job. It will help you to get the best work and that is the kind of work you want to cater to. I prize the knowledge and training that I have derived from this source very highly. I found it a great help when I came to do good inside work in hardwood. If you do not have orders, make something anyhow.

But be careful what you make. Don't make the ordinary cheap furniture that can be bought for a few dollars at any furniture store. Make something out of the ordinary.

The National Builder from time to time has published some very nice designs with drawings and details, the construction of which would be a credit to any man. If you want any of these things for your own home, make them. Your friends will see them and you will be almost certain to get some orders. I have. Why can't you? Then you can do furniture repairs along with your other work. You will be surprised at what will turn up if you invite this kind of work. I have had all kinds of it brought to me and some that was not very desirable. Of course, you can't make much money at this business, but it is much better than loafing.

I live along the Susquehanna River and I have learned to build canoes, used very much on this river. I have built many of them and in this line have established quite a reputation, which often affords me rather profitable employment during the winter months. But let me say this, if you build boats, build good boats.

Now, last but not least, spend some of your time in reading and study. Every carpenter should take The National Builder and then get as many of the good books that they publish and advertise as he can. Strive to gain more knowledge and keep up with the times. If you don't, you will be put on the shelf and others will take your place

How to Keep Busy in Winter

W. C. HARVEY.

THIS is a question that has to be considered by many carpenters, and the answer will not be the same every year or in every place. Perhaps the best way to make a few suggestions would be to state as briefly as possible the means that have been successful in my own case, as well as in others that have come to my knowledge.

Some years ago I sent some examples of chip carving, fret sawing and inlaid work, made up in a variety of attractive articles, to a women's club when they were holding some sort of function, a bazaar, I think, with a notice that ladies could easily learn, and a class would be formed, or private instruction if required. The idea was a success, and several started, and, I may add, not only stuck to it but proved capable pupils, only one or two dropping out when the novelty wore off. The classes were continued for four months. As this class did not occupy all my time, by canvassing and letters I formed a class of boys for manual training, including fret sawing and wood turning, arranging to carry one class of larger boys through a regular course of practical carpentry and joinery at the bench. I also had a few regular apprentices in a separate evening class for framing and working from drawings, filing saws and keeping tools in order.

Another year a friend sent out a number of circular letters stating he would make cedar chests for linen, shirt waist boxes, etc., in special finish and design to conform with the interior finish, and several models were made to show prospective customers. Samples of plate rails and models of panel work were made up and enough orders followed to insure several busy weeks.

Another successful idea was to make a model house to scale from the architect's drawings, to enable the prospective owner to obtain a clear idea of what he was to expect. These models were in some cases sold as doll's houses at a good price.

A well-written letter I find is often a good way to bring the owner and carpenter together, and in these days of scientific letter writing I often find the value of engaging the services of those who make a business, or rather profession, of putting your suggestions in an attractive manner. This method does not entail so much cost as the personal solicitor, who requires a high percentage and as he is not a practical man he is often the cause of misunderstandings, if not more serious trouble.

At one time there was a good trade in storing and taking care of the screens, repairing and having them ready to go in at a day's notice; also the making of storm sash and doors, but it is now cheaper in most localities to buy them from the mill.

Other ways of utilizing spare time that have proved successful could be mentioned, but as they were not so remunerative or lasting as those I have mentioned, I will not enumerate them, as the space is limited.

St. Mary's Separate School, Collingwood, Ont. John Wilson, Architect.

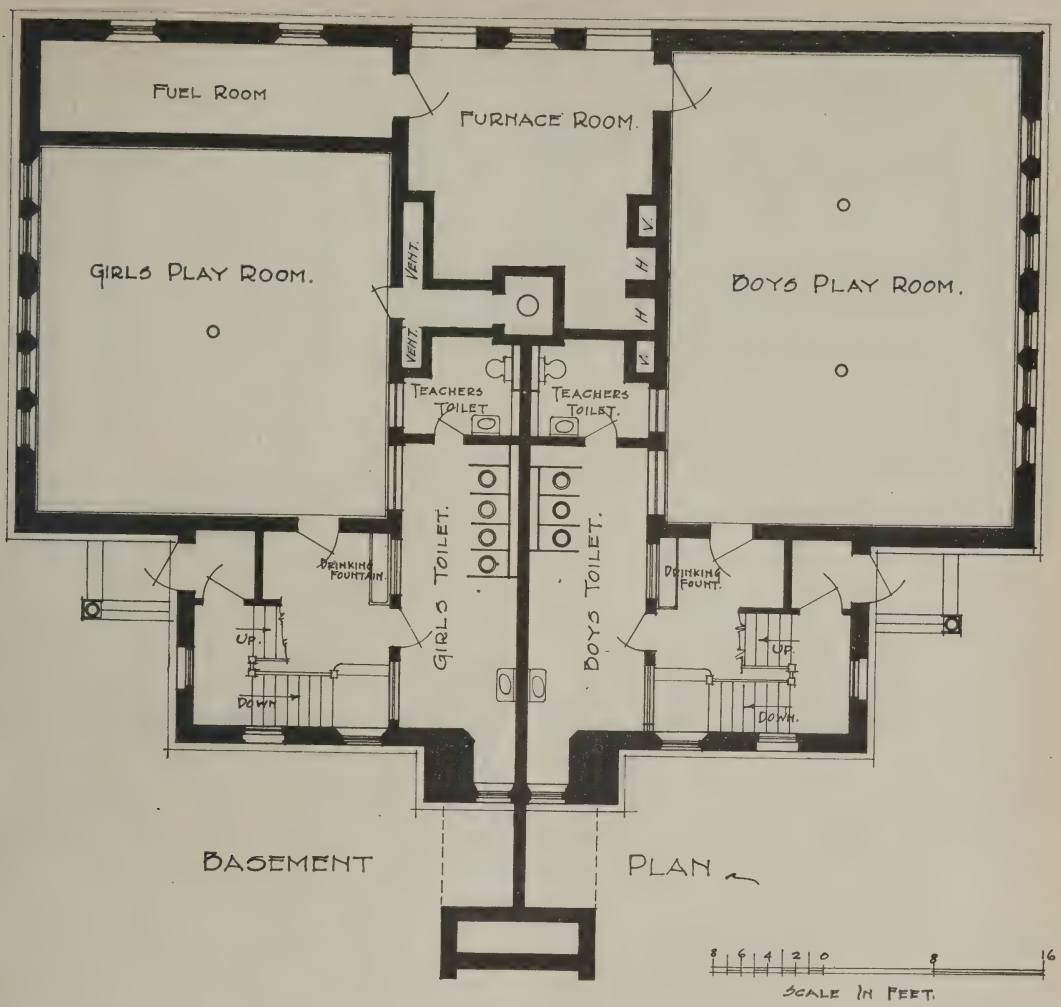
A Modern School Building

By JAMES CASEY.

THE first essential of sound school building is what may be called a noble and spacious simplicity. All fritter and frivolous ornamentations should be avoided; these things not only cost money but distract the eye and tend to vitiate popular taste, which is largely the result of early impressions. The preferable way to proceed is to balance the surfaces against the voids, taking care not to unduly multiply either, under the mistaken notion of variety. The effects of mass, however secured, are always impressive, also restful. Prefer breadth to height, and, for much the same reason, horizontal lines to vertical lines.

The scientific designer never overlooks the feature of appropriateness. A school is not a doll house, and should never, even remotely, convey any such impression. The school is a solid, sedate, impressive institution, and should be built that way; and at the same time in such attractive manner as to appear cosy and inviting to the little ones who have to visit it so often during the most impressionable years of life. No school can be said to be fit, much less well designed and scientifically constructed, which does not secure for the pupils the following essentials at least: Sanitation, safety, restful surroundings, plenty of light, well direct and diffused, and an abundance of fresh air, in other words, effective ventilation.

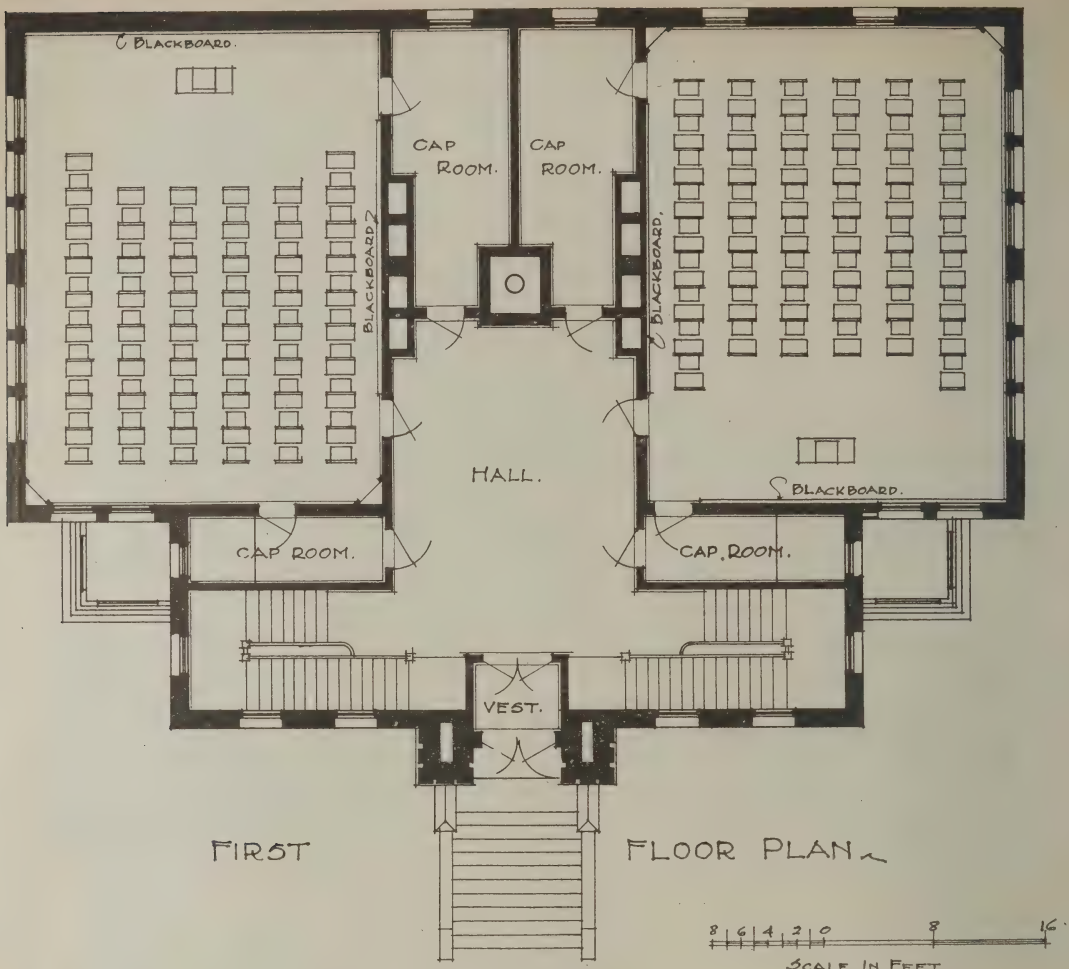
The title heading these remarks is "School Building," and this title was advisedly selected; for what we are now considering is the educational home of every day life, and not



that more ambitious and ornate affair of the college or university, which calls for quite another kind of treatment. This brings up the question of "style," and the distinction popularly drawn between "building" and "architecture;" though as a matter of fact the distinction (here assumed) is by no means as clear to the expert as the average outsider is apt to imagine. The truth is: good building is always good architecture, and, conversely there is no good architecture without good, structural building. In other words, the difference between building and architecture is one of degree rather than of essence. The first requisite of all sound and right designing is that every building should, in some measure at least, announce its purpose as thus: educational, ecclesiastical, city hall, office building, residence, etc. With this as a guiding motive, the skillful designer can always furnish something appropriate to the occasion.

The school building is a big subject, and the limits imposed by space will not allow of our going into it in anything like a full and exhaustive manner. The salient features of the subject however can be briefly stated, and that we now purpose to do, with the aid of the cuts that accompany these remarks. The school illustrated is St. Mary's Separate School, Collingwood, Ontario, Canada; John Wilson, Architect. Let us first consider the general view or perspective.

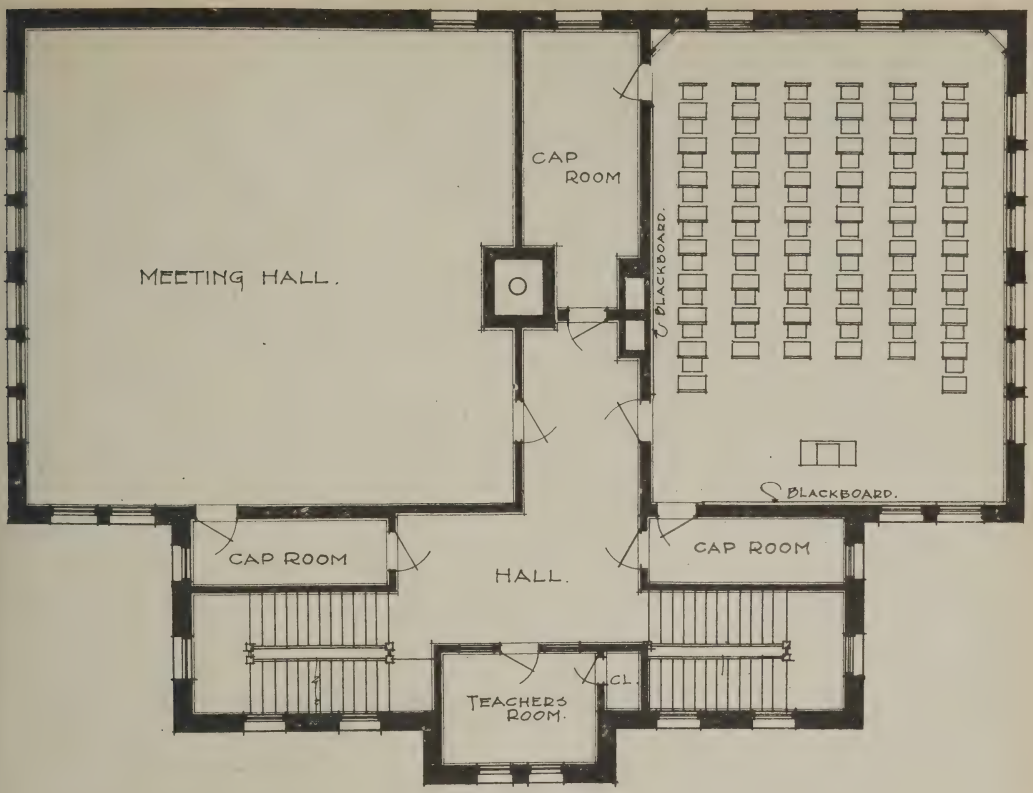
A cursory glance at the elevation suffices to assure us that we have to deal with a public building, probably a school. The



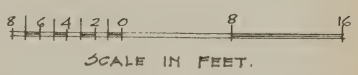
building stands in its own grounds, and it admits light from all sides. The main entrance is emphasized in sundry ways: the circular headed doorway, the steps leading up to same, the tablet over the doorway, the tower-like projection, the pediment at the top, and the belfry crowning all. What else do we learn from the exterior?

The entrances to basement—two in number, though but one shows in the illustration—proclaim themselves and their purpose. The arrangements of the windows, on either side of the main entrance, clearly indicate the location of the staircases; and the grouped fenestration in the side elevation tells us where to look for the class rooms. All this is good designing; the exterior announces the interior arrangements, and usefully, as would be manifest in such a case as a fire for example. One word further as to the perspective view, before we proceed to the floor plans. The front elevation shows a broken, five-fold surface, sopped cornices, etc.; in other words, mass effect is sacrificed, and vertical lines predominate over horizontal lines. By way of contrast, the return or side elevation exhibits the predominance of flat surfaces, massed effects, and horizontal lines. The reader who has

Turning to the floor plans, we find the arrangements are for the most part both simple and excellent. The halls and passages are ample, and give ready access to the various class rooms. The doors are numerous and well placed; they do not interfere with each other, and all open outward. The staircases are just where everyone can find them. There are no long flights, and no winders.



SECOND FLOOR PLAN.



Upon the first floor there are two classrooms, each having accommodation for fifty pupils. The arrangement that provides three doors to each room deserves noting. In the basement are the toilet rooms and the playrooms, with separate approaches for boys and girls. The furnace room is well placed, and practically isolated; access is through the boys' playroom. A stout door between play room and furnace room, and a little fireproofing of a cheap kind, makes everything amply safe.

The building trade has so many sides to it that no one man can possibly know it all. As Take for illustration the very building now under consideration. In consulting the first floor plan given herewith, the reader will not fail to observe that while the class to the left is seated so as to face the rear the class to the right is seated so as to face forward. If not already advised in the matter of school lights, the reader will naturally ask: Why this difference? Now, according to the accepted rules of school lighting, it is not a case of difference but of uniformity. The approved practice is that the light should be admitted from the left and rear of the children. The greater light from the side. The class should face a blank wall, against which the blackboard should be placed. Facing the light is hurtful to the eye. All cross lights, as from both sides of the room, are objectionable. The entire window surface should be about one-fifth of the floor space, etc.

As will be seen, the subject of school building raises quite a variety of interesting problems.

Building Contracts

By W. J. STANTON.

IF A BUILDER, through his wrongful acts or omissions, presents the further performance of the contract by the contractor, or if he fails to perform stipulations in the contract which are conditions precedent to further performance by the contractor, the contractor is excused from further performance and may recover compensation for his past performance. For example, full performance is excused where the contractor is prohibited by the builder from continuing the work, or is ousted by him from the premises upon which it is to be done; where the builder fails to furnish the materials for the work as required by the contract; where the contract is for the erection of a structure in a city and the builder fails to procure from the city authorities the necessary building permit by reason of which failure the contractor is unable to complete his contract; where the builder fails to pay the installments of the compensation stipulated for in the contract and payable as the work progressed; or where the builder fails to perform certain work which he had agreed to do, and which was necessary to further performance by the contractor.

So, where the work cannot be completed according to the plans and specifications furnished by the builder, in accordance with which it was to be performed, the contractor is, it seems, excused from full performance. But the mere fact that after the contractor has failed to perform his contract the builder notifies him that he will himself complete it does not show the contractor was justified in his failure to perform, nor is it an excuse that full performance of the contract would not have been profitable to the builder. The inability of the contractor to perform the contract not due to any wrongful act or omission of the builder is no excuse for his failure to perform. Where the contractor undertakes to erect a structure for a fixed sum, payable upon performance, the mere fact that the builder becomes insolvent during the progress of the work does not justify the contractor in refusing to perform.

If the contract is entire and full performance by the contractor is excused by reason of the wrongful acts of the builder, the contractor may treat the contract as rescinded and recover the full value of his labor done and materials furnished in the partial performance of the contract, though this may exceed the contract price. Where the builder has, by his wrongful acts, prevented the performance of the contract, the contractor may maintain an action on the contract for damages resulting from the breach by the builder and recover as damages the full value of his part performance, or may recover in an action on the contract the value of his part performance according to the contract, and in addition damages for the loss of profits he would have made if he had been permitted to complete the work.

The fact that full performance of the contract is prevented by the wrongful acts of the builder does not necessarily entitle the contractor to recover the compensation provided for in case the contract was fully performed, and where the compensation is paid in advance the contractor is not entitled to retain the full compensation without regard to the value of the work done in the partial performance; but where the contractor has been put to the same expense in time and money in his partial performance of the contract as if he had fully performed, he has been allowed to recover the full stipulated compensation. If the contract is separable or divisible, and the contractor performs with regard to some of the divisible items and is prevented by the builder from further performance it has been held that if he treats the contract as rescinded and sues for the value of his work and labor, he cannot recover the full value of the work performed, irrespective of the contract price, but is entitled to recover only the contract price for the items fully performed and damages to the amount of the profits that he would have made if allowed to perform the other items. Thus, in a case before the supreme court of Iowa, where the contractor under a divisible contract agreed to paint ten houses at a certain price for each house, and after completing four was prevented by the builder from doing further work, it was held that the contractor could recover only the contract price for the houses completed and damages to the extent of profit he would

have made if allowed to complete the full work.

The builder may, of course, waive a full performance of the contract so as to entitle the contractor to sue on the contract, and an acceptance of the work as in compliance with the contract will constitute such waiver, when the builder accepts the work as a full compliance with the contract he cannot, as a general rule, either maintain an action for damages for a failure of the contractor strictly to perform the contract nor recoup such damages in an action by the contractor for compensation. An acceptance is not a waiver of latent defects in performance so as to preclude the builder from maintaining an action for damages or recouping damages therefor, and, of course, if the acceptance of the work is expressly on condition that the contract remedy certain defects therein the builder is not precluded from claiming damages for such defects.

Where the work is inspected by the builder during its progress and it appears that the contractor is not complying with the contract it is the duty of the builder to object to such work as does not comply with the contract and upon his failure to do so he cannot, after the work is completed, claim that the work was not done in accordance with the contract. Where a structure or other work is erected on the land of the builder or repairs or alterations are made on an existing structure, the mere fact that the builder, on the failure of the contractor fully to perform his contract, takes possession and occupies or uses the building erected does not necessarily constitute an acceptance of the work as a performance of the contract and a waiver of the contractor's failure fully to perform; but such possession or use is evidence of a waiver to be considered in connection with the other circumstances of the case.

A payment on account of the contract does not itself amount to an acceptance of work not fully performed so as to constitute a waiver of the contractor's failure to perform in full, and if the builder was unaware at the time of such payment that there were such defects in the work he does not waive full performance.

Experiments in the Cement Industry

The Geological Survey has recently completed a long and exhaustive series of tests on cement and concrete. So important are these materials that we give a few extracts from the advance chapters of the publications.

PORTLAND CEMENT.

Portland cement is the product obtained by calcining to a clinker a finely ground artificial mixture of properly proportioned calcareous and argillaceous substances and finely grinding the resulting clinker. Only such additions are permitted subsequent to the calcining as may be necessary to control certain properties, and such additions should not exceed 3 per cent by weight of the calcined product.

The raw materials consist essentially of lime, silica, alumina, and iron oxide in certain definite proportions, obtained by mixing limestone or marl with clay or shale. The clay, shale, or slag furnish silica, alumina, and iron oxide. Impure limestone, called "cement rock," in which all the ingredients are present in nearly the proper proportions is also used alone or is corrected by the addition of purer limestone. The mixture of raw materials should contain about 3 parts of lime carbonate to 1 part of the clayey materials. The calcination or burning takes place at a high temperature, approaching 3,000° F., and must therefore be carried on in kilns of special design and lining. During the burning, chemical combination of the lime, silica, alumina, and iron oxide takes place. The product of the burning is a semifused mass called "clinker" which consists of silicates, aluminates, and ferrites of lime in certain fairly definite proportions. This clinker must be finely ground. A small and limited percentage of gypsum (hydrous calcium sulphate), is ground with the clinker. After such grinding the powder (Portland cement) will set under water.

WATERPROOFING CONCRETE.

To render cement mortar and concrete water-tight has long been one of the hopes of cement users. In response to the supposed

necessity for the addition of some foreign material that might act as a waterproofing or damp-proofing agent, 50 or more substances have been put on the market and sold under strong claims as to their efficiency. In response to the demand for light on this subject, a series of tests were carried on at the structural-materials laboratory of the Geological Survey in St. Louis, Mo. When this work was transferred to the Bureau of Standards, the unpublished data were delivered to that bureau and only recently have they been made public.

In arranging these tests it was necessary to determine the permeability and absorption of Portland cement mortars and concrete made with typical materials, and to ascertain the necessity for and the value of so-called waterproofing and damp-proofing mediums as well as to determine the composition of the compounds and materials recommended for such uses.

The permeability tests of mortars and concretes were applied to mortar and concrete made with several different proportions by volume of Portland cement and different grades of sand, also with various proportions of several grades of sand and stone. The consistency was either damp or quaking, and the thickness of the test pieces was varied. The tests extended from 3 to 6 weeks and were made in triplicate. Some of the important points in regard to the character of mortar and concrete that were demonstrated are as follows:

RESULTS OF THE TESTS.

In the permeability tests of mortar the richer the mixture in cement the less permeable was the mortar. The quaking consistency was less permeable than the damp consistency. The quantity of water passing through decreases with the continuation of the flow. The permeability was approximately the same for similar mortars, whether in a 1-inch, 2-inch, or 3-inch thickness of test piece. The permeability of mortar decreases with its age. The coarse sand mortar was more permeable than the fine-grained sand mortar. The value of troweling mortar surfaces was also demonstrated by the tests.

In the case of concretes, those richest in cements were the least permeable. The permeability of the concrete increased with its age. The concrete showed very slight or no decrease in the quantity of water passing, with the continuation of the flow. The 3-inch-thick test piece is slightly less permeable than the 2-inch. Concretes made with sand No. 4 were slightly more permeable than those made with sand No. 5 which contained the greatest percentage of fine materials. The permeability of the concrete was not dependent entirely on the quantity of cement used in proportion to the total aggregate, but depended also upon the ratio of coarse aggregate to fine aggregate.

In the tests of absorption, the richer the mixture in cement the less the absorption of the quaking consistency mortars, but the richness had less effect in the damp consistency mortars. The absorption was less in the quaking consistency mortars than in the damp consistency mortars. The absorption increased with age from the first to the second week in the damp consistency mortars, but decreased from the second to the twenty-sixth week.

For the tests of damp-proofing and waterproofing compounds and materials 40 different compounds were purchased in the open market and several void-filling materials were obtained. A complete record of each compound is reported as to its character, chemical analysis, method of application, result of physical tests, and noted peculiar characteristics. The compounds are of two general classes: Waterproofing compounds for preventing the flow of water through masonry where subjected to a hydrostatic head, as in reservoirs, cisterns, tunnels, etc.; and damp-proofing compounds for overcoming dampness resulting from the capillary attraction and absorptive qualities of masonry, preventing dampness in habitations, and the disfigurement of exterior and interior surfaces of brick, stone and concrete walls and interior plastering and decorations due to staining and efflorescence. The Portland cement and sand used throughout these series of tests was the same as that used in the tests of mortar and concrete.

GENERAL CONCLUSIONS.

The general conclusions may be summarized as follows, the first series of tests on plain mortar and concrete being correlated with those made with mortar and concrete that had been treated with the various waterproofing and damp-proofing compounds:

Portland cement mortar and concrete may

be made practically water-tight or impermeable (as is defined below) to any hydrostatic head up to 40 feet without the use of any of the so-called "integral" waterproofing materials, but in order to obtain such impermeable mortar or concrete considerable care should be exercised in selecting good materials as aggregate and proportioning them in such a manner as to obtain a dense mixture. The consistency of the mixture should be wet enough so that it can be puddled, the particles flowing into position without tamping. The mixture should be well spaded against the forms when placed so as to avoid the formation of pockets on the surface.

The addition of so-called "integral" waterproofing compounds will not compensate for lean mixtures, nor for poor materials, nor for poor workmanship in the fabrication of the concrete. Since in practice the inert integral compounds (acting simply as void-filling materials) are added in such small quantities, they have very little or no effect on the permeability of the concrete.

Where Portland cement is used as a plaster coat, if sufficient cement be used and the sand contain sufficient fine material (or a fine material be added) and the mortar be placed without joints and well troweled (care being taken not to overtrowel, which may cause crazing), the coating will be effective as an impermeable medium without the use of any waterproofing compound.

As a precaution, under certain conditions, it is undoubtedly desirable to use bituminous or similar coatings, even on new work, as protection where cracks may occur due to the settling of the foundation or expansion or contraction caused by temperature changes. In large or exposed work it is practically impossible to prevent some cracks, but where cracks can be prevented no coating whatever is required to make the structure impermeable.

None of the integral compounds tested materially reduced the absorption of the mortars before they were dried by heating at 212° F. Thus they would have little or no practical value. But some of the so-called integral waterproofing compounds did decrease the absorption obtained after drying the mortars at 212° F., and the rate of absorption was much slower in these cases. The addition of hydrated lime and clays seemed to have little or no effect on the absorption.

The addition of any of the compounds tested to a mortar in the quantities used in these tests does not seriously affect the compressive or tensile strength. The addition of inert void fillers to mortars, as used in these tests, up to 20 per cent of the volume of cement, increases the compressive strength.

IMPORTANCE OF TESTING CEMENT.

The importance of testing cement just before using it is generally recognized by large consumers, but it is entirely overlooked by the great majority of those who employ cement on a small scale, as in building sidewalks and small houses, cementing cellars, etc. These suggestions are therefore addressed only to consumers who have never looked into the matter of having tests made. A few important reasons why tests are essential are as follows: On account of the nature of the manufacture of cement from raw materials which are rarely constant in composition, the resulting product can hardly be expected to be invariably uniform. Manufacturers generally take precautions to prevent the shipment of defective cement, but the tests made at the mill can not always reveal imperfections in manufacture. The properties in cement are subject to alteration after leaving the mill. Cement that is found slightly inferior when tested at the mill may be sold where it is not likely to be tested. Cement that is tested by large purchasers at the mills and rejected by them may be sold to smaller consumers.

In order best to ascertain the quality of cement shipped the tests should be made after the cement arrives on the work, and they should be made with the greatest care and only by responsible and trained men in laboratories where the instruments have been properly standardized.

For the purpose of correcting any misapprehension that may arise, it should be stated here that the United States Geological Survey maintains no testing laboratories and does not make any kind of tests of cement or of any other structural materials either free or for compensation. Such work should be intrusted to private commercial laboratories, such as are in operation in all the large cities of the United States.

The Bungalow Roof

THE ROOF makes the bungalow, writes A. C. Clausen in the Muskegon News Chronicle. The very fact that the roof is placed one story lower is the first requirement, but that is not all. Fashion the roof in any way you please, give the eaves a six inch projection and you have but a cottage. Fashion the roof as you please, on a one-story home, give the roof from three to five feet projection, and you have a bungalow.

In the extreme western states, especially throughout California, no attempt is ever made to use the attic space for living purposes. This makes it possible to have the roof very much lower, which gives it a more attractive appearance than to have a bungalow roof too steep.

In colder climates, where there is snow on the ground for at least three months a year, the pitch much be steeper so that the wind can blow the snow from the roof as much as possible, for melting snow will rot shingles quicker than anything else.

PITCH OF THE ROOF.

Having increased the pitch of the roof for this practical purpose, the man in the northern states would invariably see the possibility of using the larger amount of space in the attic for some practical purpose. Since spreading a bungalow out too much upon the ground increases its expense to considerable extent, this space in under the roof is used for one or two bedrooms. In this way the bungalow becomes practically a story and a half house, but having apparently very little roof and wide eave prejection, and a certain feeling of studied rusticity about it, it passes for a bungalow, for want of a better name. Also, to distinguish it from the one-story bungalow, with practically no attic, it is sometimes called a two-story bungalow.

The most common type of bungalow roof is the hip roof, known by some people as the square roof, a roof which slants into a peak from all sides, but the most picturesque roof, and the one giving the most amount of room on the second floor, with the least expense for dormers, is a roof of broken gables, arranged to give as unique and picturesque effect as possible.

STYLES OF THE ROOF.

While bungalow roofs are frequently boxed in square under the eaves or cornice, they have the best appearance in this style of home when allowed to overhang (depot roof style) with the rafters showing. While the main roof rafters of the average bungalow not too large can be 2x4 inches placed 16 inches from center to center, a more rugged and picturesque appearance is obtained by letting the rafters which show be placed about 30 inches from center to center and 4x4 inches in size. These extend up onto the other rafters, or properly braced between them, so that the construction is just as substantial as though the main rafters themselves extend out and the effect is better. Ornamental brackets are not appropriate for bungalows; in fact, as little ornamental mill work, mouldings, etc., should be used in the bungalows, both inside and out, as possible.

AMALGAMATING TWO STORIES.

While they did not spring from the same source, the bungalow style and the craftsman style are fast amalgamating into one and the same thing, the simplicity of the latter being combined with the convenience of the former.

While the low, squatty appearance of the bungalow is one of its attractive features, such a home should not be built between two tall two-story houses. It gives it too much of a shut-in, insignificant appearance. Bungalows should be built in a neighborhood of bungalows, or else upon lots, preferably corner lots. Having a low, broad, spreading appearance, it should not be cramped into a narrow lot. A bungalow always presents the best appearance, especially the roof effect, when the broad side of the home is to the front, with a large yard both front and rear.

The porch roof should always be some kind of an extension of the main roof, being connected with it in some way that will give an appearance of unity and not a "built-on-afterwards" appearance.

Estimating on Interior Painting

By A. ASHMUN KELLY.

A CORRESPONDENT of the NATIONAL BUILDER "wants to know the simplest way to figure and estimate house painting, more particularly the interior parts of a house." The simplest way is to get the superficial area of surfaces to be painted, in square yards or feet, and then allow a certain quantity of paint to the square. That will show how much paint will be required, but it will not tell how much time will be required for doing the work. Also, the condition of the work must be taken into consideration. Is it new or old work? Is it old work in good, fairly good or bad condition?

It sometimes requires as much time to prepare some work for finish as to do the painting. There is the sandpapering and puttying, for instance. And it will take longer to paint with flat or turpentine color than with oil paint. Window sash take longer time than the same area of plain painting. One-color work will take less time than parti-color work.

Indeed, there are so many problems entering into the proposition that it would be very difficult to give in a small compass all the information required to answer the very simple question of this correspondent. There is a very valuable little book selling for a dollar that covers this so completely that I cannot refrain from mentioning it. It is called "The Painter's Estimator. First of all it tells you to carefully look into the character of the work, see just what is to be done. Then measure it, either from the plans or from the work itself. In many cities there are professional measurers, and their rates may be about the following:

For measuring work up to $ 150, 5 per cent
For measuring work up to 500, 4 per cent
For measuring work up to 1,000, 3 per cent
For measuring work up to 5,000, 2 per cent
For measuring work over 5,000, 2 per cent

Inside work is usually classified as follows:

1, 2, 3 and 4 coat work, one color.
Graining and varnishing.
Zinc work and parti-colors.
Hardwood filling and finishing.

Now it must be remembered that interior work will include walls as well as woodwork, water coloring as well as oil or flat painting. Every detail must be noted, measured and put down in a memorandum book. Beginning with the first floor, take room after room, then hall, etc. Parts that measure in width only a few inches, say a baseboard, are considered as one foot. Measurements of say 18 inches wide we make three feet. I mention this here to show that it is not a simple measurement that gets all the area into square feet or yards, but a most painstaking measurement that allows something for difficulties, etc. If we were to do a lofty ceiling we would have to charge for more than mere superficial area, for it would involve more expensive scaffolding than a lower ceiling would. This rule holds good in relation to all work requiring more or less difficulty to get at, and for the extra time required to get to and from the work, also for the fact that one cannot do as much work in a given time under the circumstances as where the work is on or very near the ground. In making up an estimate scaffolding must be estimated, with a certain charge for any staging requiring the services of a carpenter.

The book which I have alluded to gives detailed statements covering the best method for measuring every possible detail of the interior of a building. It would take up too much room here to give any part of this list that would be serviceable to the inquirer.

Master painters know from experience and observation approximately at least just how much a workman will do in a day, and how much paint will be required to cover any certain kind of work. One way to ascertain how much paint will be required to cover a given area, using good white lead paint, on wood, is to take the number of square feet of surface and multiply it by 200, which will give the number of gallons of paint required for two-coat work. The usual estimate for ready mixed paint is that a gallon will cover about 500 square feet of average wood surface, or metal if smooth. To ascertain the number of pounds of white lead ground in oil required to cover a given area of square feet, divide the area by 18, which will give the amount of lead required for three-coat work, the lead being thinned for painting.

However, it must be remembered that all such estimates are at best but approximately correct, so much depending upon conditions of surface, etc., already referred to.

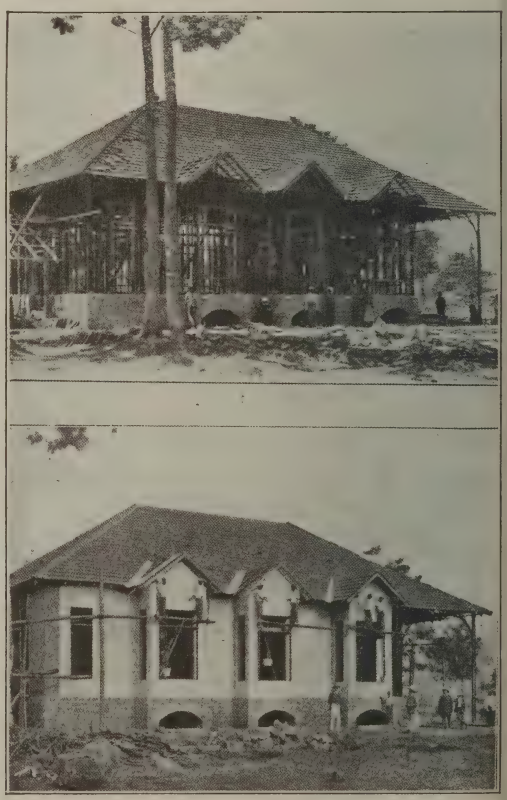
The question asks for "the simplest way." I presume this to be the looking over the work and forming a mental estimate of what the job is worth. Many do this, but I have known none that ever became even moderately wealthy as a result of following this way of doing work. In the case of a small job, say one room of plain construction, an expert might figure close enough, certainly close enough not to lose at his end, whatever the client's fate might be. But the safe and sure way is to measure your work, with rule or tapeline. Ascertain the area, and figure what it will take of paint and time to do the work. As to the latter item, it is not easy to say what should be estimated, there being no uniformity in men's output of work. Some estimate that the paint and time of painting will be about even; that is, if the paint per day is worth $4.00, the time or labor may be set down at $4.00. Some vary this proportion, as must in some cases at any rate be done, for the work may vary in the matter of time and paint required. Thus, some surfaces may require much more paint than certain other surfaces, or the time required for application of paint may be greater owing to poorly prepared surface.

Attention often has been called to the wide divergence of bids on painting, given on certain jobs, some offering to do the work for about one-half the price asked by another. This may be ascribed to either of two things: the bidder was unable to bid intelligently, or he had a plan for doing the work at his low figure. Some are able to do work at a lower figure than certain others, and do it right, too. For instance, if you work with your men you can do it. If you are running an inexpensive plant you can do it.

Expanded Metal Bungalows

The home of the bungalow is India, but notwithstanding that fact, European and American methods of building them obtains on native soil, to a large extent. The latest is the introduction of expanded metal in their construction, and many buildings of this sort, of more or less pretentions, are being erected in various parts of India, being prepared and made ready to put together, and are sent out from England to their intended sites, where they are taken in hand by the native workmen, under the direction of a white superintendent, who controls the whole work. We show two views of a modern steel framed bungalow, with a foundation of concrete blocks, and a superstructure of expanded metal and stucco work. The engraving also shows a number of natives at work on the exterior of the walls.

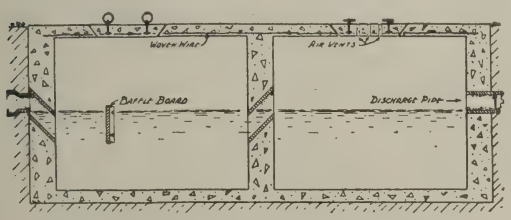
Japan is also calling for these metal built bungalows, and as soon as China gets its "little unpleasantness settled," its teeming millions will be demanding buildings of this kind to house some of its people. Expanded metal, is an excellent material for building purposes in India, Ceylon, Sumatra, and other islands, because of its being proof against the ravages of the white ant.



Sewage Disposal For Country Homes

By PERCY H. WILSON.

THE general use in country homes of the modern conveniences of the bath and toilet has made necessary some effective and inexpensive means of disposing of the sewage. Otherwise the drinking water will be polluted and the health of the family endangered. Entire satisfaction is obtained by the use of the septic tank, which is nothing but a long water-tight cistern through which the sewage passes very slowly and evenly. Located underground, it is warm and dark—ideal conditions for the development of bacteria, little germs which eat up the sewage and render it harmless in much the same manner as another kind causes cider to ferment. The purified sewage, then merely clear water, may be discharged into an ordinary farm drain tile.



SIZE OF TANK REQUIRED.

Although the odor from a small septic tank is practically unnoticeable, yet it is best to locate it at least a hundred and fifty feet from the house. Choose a spot where it can be sunk to ground level and will be out of danger of flood waters. The tank should be large enough to hold the entire sewage for one day. For a family of eight to ten, plan a concrete tank of two compartments each 4 by 4 by 5 feet long. Since the top and bottom are each 4 inches thick and the division and sidewalls 8 inches, dig the pit 4 feet 8 inches deep, 5 feet 4 inches wide and 12 feet long.

MAKING THE FORMS AND POURING THE CONCRETE.

If the ground stands firm, only inside forms will be needed. Make two, each 4 by 4 by 5 feet long. Old 1-inch lumber will do for the siding. The compartment into which the sewage first enters is called the "charge tank." In each end of the wooden form for this tank cut openings for a 5-inch tile with the lower edge of the hole 16 inches above the bottom of the form. Through each of the sidewalls of this same form, 18 inches from the inlet end and 1½ and 2 feet above bottom, bore 1-inch holes and insert in them greased wooden pegs extending 4 inches into the future sidewalls. Likewise, in the other form for the discharge tank, cut openings for a 5-inch tile, this time with the lower edge of the hole 2 feet above the bottom.

Mix the concrete one part Portland cement to two parts sand to four parts crushed rock, or one part cement to four parts pit gravel. Place the 4 inches of concrete in the bottom and trowel to an even surface. Immediately set the forms in place so as to leave room for 8-inch division and sidewalls. Fill the forms with mushy wet concrete. At the proper heights insert the 5-inch drain tile through the holes in the forms. Be careful that the outside end of the inlet tile to the charge tank is 2 feet and its other end 16 inches above tank bottom. The pipe leading from the charge tank is also set at

the same sharp slope. The outlet tile from the discharge tank is 2 feet above bottom and with both ends level. By this arrangement of pipes, the sewage is kept in the tank to the depth of 2 feet and the ends of the tile in the charge tank are trapped or air-sealed, which aids the activity of a certain kind of bacteria. Likewise, other bacteria are developed in the discharge tank by means of the free circulation of air through the

discharge drain tile and holes in the manhole cover.

REINFORCED TOP AND MANHOLE COVERS.

After the sidewalls are three days old, floor over the top of the forms and prepare to lay the 4-inch concrete top. As molds for the manhole covers, have the tinner make two round bottomless dishpans, 18 inches in diameter at the bottom and 24 inches at the top. Grease these tin molds and set one on the wooden floor over each compartment. Bore six 1-inch holes in the floor inside the one manhole mold over the discharge tank and insert in them greased pegs projecting upward six inches.

Place one inch of concrete over the entire floor and at once lay on it, crosswise the tank, strips of heavy woven-wire fencing 5 feet 2 inches long, or ⅜-inch rods running in both directions and spaced one foot. Likewise reinforce the manhole covers. Immediately place the remaining 3 inches of concrete and do not stop until the tank top and manhole covers are finished. Provide two lifting-rings for each cover by setting in them halves of old bridle-bits, or hitching-post rings, fitted with knobs of wire or with nuts and large washers. If a square wooden manhole mold is used, the concrete cover cannot be cast at once. In such case, carefully remove the wooden manhole form five hours after the top has been finished. Three days later mold the cover the same as for the tin form with this important exception—place heavy paper or cardboard around the edges of the opening to prevent the fresh concrete of the cover from setting to the old concrete.

When the top of the tank is ten days old, lift off the manhole covers, saw openings in the wooden top and remove the forms. In the holes made in the sidewall by the greased wooden pegs, insert ½-inch bolts and set them with mortar. To these bolts fasten the 1 by 12-inch wooden baffle-board which extends across the tank and breaks up the current of the inflowing sewage. To carry the sewage from the house to the tank, use 4-inch sewer pipe laid with tight mortar joints. Connect the discharge end of the tank with a string of drain tile.

INEXPENSIVE BILL OF MATERIALS.

The materials required for the tank described above are 5½ cubic yards of crushed rock, 2¾ cubic yards of sand and 9 barrels of Portland cement. If good pit gravel is used, no additional sand will be required.

When the septic tank is two weeks old it may be put to use. It will need cleaning at intervals of two to three years. By its use the health of the family will be protected and life in the country home will be made much more comfortable.

Old Wood Versus New

The natural impression is that new wood is stronger than old. It has been found, however, in a series of tests that some white pine a quarter of a century old is materially stronger than new wood. Pine is the wood on which the experiments were made, but there is no reason to suppose that oak, hard pine, or any other wood commonly used in building would behave differently. All wood maintains its strength, except as decay weakens it or fire and mechanical abrasion destroy it.

Engineers are already using wood for permanent service where it is kept under water. Its permanent reliability under such conditions is literally a foundation fact in engineering. Wood above water is subject to destruction by fire and decay, but if these two enemies are kept away it is difficult to set a limit to the useful life of timber. There are plenty of wooden truss bridges all through the east whose structures have been protected from the weather and which have been carrying traffic from 50 to 100 years. The bridge over the Hudson which was burned last year was in service about 105 years. Many who have traveled will recall noted wooden bridges and other wooden structures abroad of much greater age. In fact, were it not for the increasing cost and scarcity of good timber, there is reason to believe that many country highway bridges of moderate span and light loads would be more permanent if built of wood than of steel. Although wood is the oldest historically of our constructive materials, yet the question of change of strength with age has never before been studied.

Dry Basements and Walls

DRAIN tile should be porous and laid with open end joints and covered with a layer of crushed stone or screened gravel. Care should be taken to lay the tile well below the finished floor of the cement to insure a dry floor, says the Building Bulletin.

When concrete footings are used, the tile should be laid at the bottom and not at the top of the footings, as is often done. This will insure dry footings and prevent the water accumulating outside the footings and a few inches up on the stone or brick wall before getting into the drain tile, which is the case where tile is laid on top of concrete footings.

Where this method is followed, the water saturates the wall, and capillary attraction causes the water to travel upwards until the whole wall is saturated with water. This occurs when great care has been taken to waterproof the outside of the walls, and is often charged to poor work of the contractors, when the fault was with the method. A damp course should be placed on top of concrete footings to stop all moisture from entering the wall.

Where great weight is to be carried by the footings and it is desirable to cast the concrete solid in the trench, two lines of drain tile should be used, one line cast in the concrete at the outside on the clay in the bottom of the trench. Strips of No. 2 tarred felt, cut four inches wide and two-thirds the outside diameter of the pipe, should be placed at every joint so as to prevent the liquid cement in the concrete from flowing into the tile.

Drain tile should be laid with a fall of three inches to the 100 feet. Some builders place them on the level, with very good results. In this case, the water will stand in the drain at the low points, but will do very little damage.

The inside of all walls below ground and for all basements where it is desired to have the rooms dry should be lined on the inside with porous hollow brick or block. This will prevent the condensation of moisture from the atmosphere caused by warm air coming in contact with a solid cold body.

This condensation of moisture from the air is not well understood. Many builders treat the walls to keep out the moisture when the trouble is the same as takes place on a pitcher of ice water on a hot day—air moisture formed in beads or drops on the outer surface of the glass. This moisture did not come through the glass, but was taken from the air.

We speak of dead air; that is, air that has little or no moisture and subject to no change. A space in the brick wall is often called a dead air space, but that is not altogether right, as the outer course of brick becomes wet from a storm and the air in the hollow wall space becomes damp, and when damp is a good conductor of cold; therefore, a hollow wall is not always a good protector for a house.

The more dense the walls of a house the more need of protection against cold, as the wall will store up cold in direct ratio to its solidity. A wall made of cork would absorb and hold very little cold, while one made of cast iron would store away almost as much cold as water frozen into ice, and would radiate this cold to the room inside unless the wall had a proper insulator.

For fireproof buildings of stone, brick or concrete there is no better material than hollow porous brick and blocks, while for frame buildings a good grade of building paper is used. Furring and lathing for plaster in a brick building make a firetrap of the brick wall, as fire gets between the plaster and the wall, and is soon spread all over the building.

Care should be taken to have no circulation of air from gables, church lofts, attics and rafters down into the hollow space intended for weather-proofing, as this air will condense on the outside wall and cool the inside wall or plaster. Warm air will not seek a lower level, hence hot air in the attic will not circulate in an air space open at the top; but cold air, being heavy, will pass to the bottom and be warmed by the heat of the rooms and then rise to the attic, to be replaced by cold air again. This cause makes many houses and churches very difficult to heat.

Sound Deadening

ONE of the hardest things to accomplish in building construction is perfect sound deadening, Mr. Westwood writes in The Improvement Bulletin. During the last few years a great deal of attention has been devoted to the subject by technical schools and some of the architects and engineers. It seems simple, for we know absolutely what sound is and it would appear that there being no uncertainty as to the nature of sound and as to its conduction, no difficulty should be encountered in securing the deadening or killing of that conduction. There would seem to be several reasons, however, why so few of our buildings are successfully deadened. Perhaps the chief reason is that sound is transmitted through all rigid materials and it is absolutely essential to construct floors and partition walls of rigid materials. Another reason is that sound is subject to reflection and many materials used in building construction are excellent sound reflectors.

Page's Physics says, regarding sound, "Sound originates in vibrating bodies and reaches the ear by the intervention of some medium capable of being set into vibration." Sound vibration should not be confused with such a vibratory motion as the shaking of the building by a high wind pressure or the "rocking" of material. In fact, much sound vibration is so minute in the width of the vibration as to be imperceptible to either the eye or the body, but is felt by the delicate membrane and mechanism of the ear. The more elastic the material the greater its sound conductively is the general rule. So that metals are generally better conductors than woods, and air—in fact, practically every gas—is an excellent medium or sound conduction. The only way therefore to deaden is to introduce between the source of the sound and the ear, some medium that will not respond to the vibratory motion of the elastic medium in which the sound vibratory motion exists. Another way that sound is sometimes killed is by two sound vibrations meeting and counteracting each other, so that the vibratory motion of each is nullified. This, however, may be thoroughly disregarded in our consideration of the subject as it is not a condition which exists in buildings, except by some mere chance, and then only under entirely uncontrollable circumstances.

The principal materials used in building constructions for support of floors and walls are wood, iron, tile, brick and cement. All of these materials are rigid and more or less elastic. Wood or iron suspended is an excellent sound reflector. The result is that laughing and talking or musical instruments set up sound vibrations in the air in the room which vibrates against the walls or the floor, conducts through the plaster or the wood or the cement by setting up a vibratory motion in that material, and so on through the wall or floor structure, and setting up similar motion in the air on the other side of the structure which air vibrates against the air of the listener. With walking we have a little different condition in that the vibratory motion is secured in two ways: First, the impact of the foot on the wood or cement floor makes some noise and sets up a vibratory motion in the air above the floor, which is conducted to the walls and to other parts of the floor, and so on through the structure to the listener. But this impact of the foot on the floor also starts a vibration of the floor material and if that vibration be sharp the material responds with such a motion as is readily sound vibratory and is conducted through to the air around the listener. This motion is transmitted in fibrous materials along the fibers much faster than it is across the fibers; but in such materials as stone, brick, air, concrete and such, whose construction is not fibrous and is similar in all directions, the motion is conducted equally in every direction.

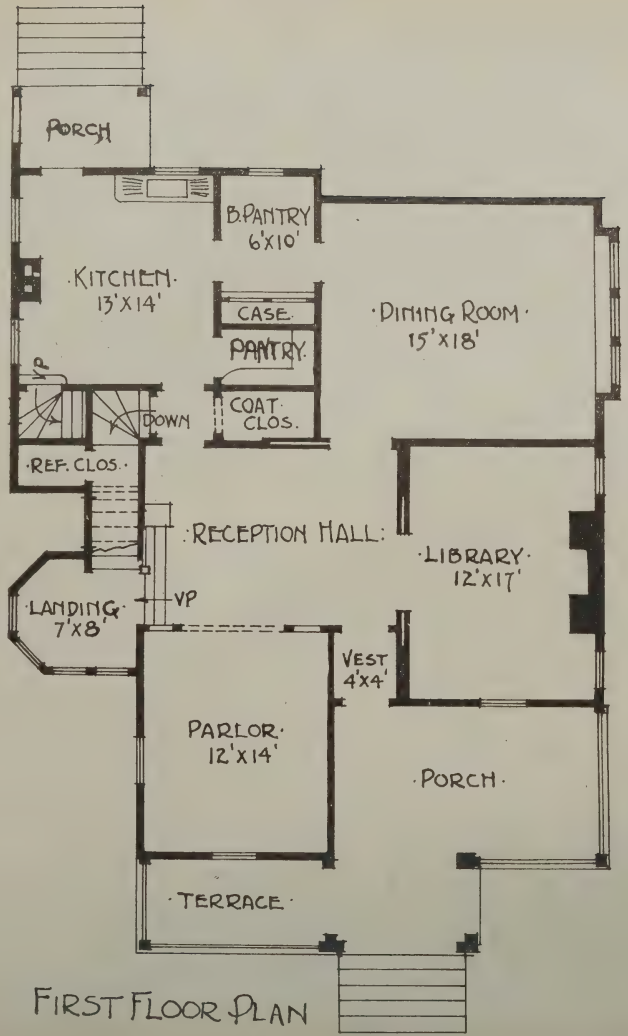
To deaden this sound conduction some soft non-vibrating material must be introduced. If the structure is of wood, the practice is to use a soft quilt or other pillowy material, as near the source of the sound as possible. Care must be taken to see that there is a very minimum amount of vibrating connection between the vibratory mediums or materials. If used in wood floors, the material should go over the rough floor and then strips should be laid on top of the material and the finished floor nailed to those strips and not to the rough floor. Be careful that your finished floor—which is the original vibrating medium of the floor construction—

does not come into contact with the wall studs or wall finish. What contact is necessary with the wall finish should be broken as far as possible. It is better, therefore, to turn the deadening material up on the face of the plaster or studs, past the level of the finished floor so that any sound which may come off the end of the floor boards will die against the quilt, instead of setting up vibratory motion in the studs. It is better to deaden a floor from the top than from the bottom as the sound vibration is immediately reduced to a minimum before reaching the rough floor and the joists. In the undeadened joist floor sound is augmented by the reflection between the joists and between the rough floor and the plaster beneath it, so that it is quite possible to introduce into that space between the joists sound of 100,000 units of intensity which could augment itself to a million units of intensity by simple reflection, as in the case of the drum. Sometimes we find an effort to deaden by packing mineral wool or other loose fibers between the joists or by laying 1-inch strips over the rough floor and packing between the strips with such fibrous material. In either case the condition through the air spaces of the construction is stopped and if the packing be between the joists reflection is prevented. But there is still direct vibrating connection between the finished floor and the ceiling below, so that some soft nonvibrating material should be used to break that connection.

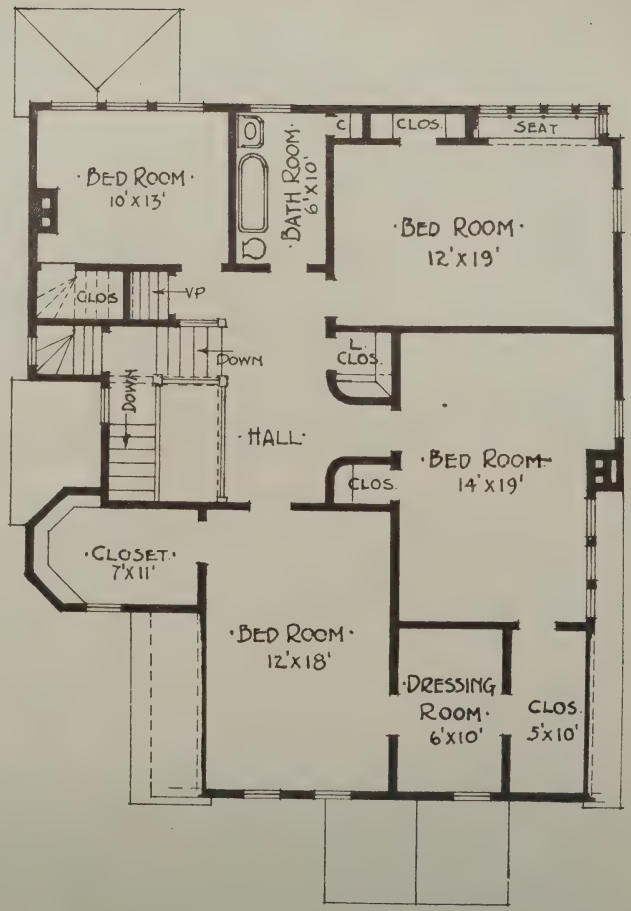
What has been said about floors applies with equal force to partitions. The theory that confined air is sound deadening is now accepted as a fallacy and we are appreciating that quite the reverse is true, namely: that that confined air may act as a medium to augment the intensity of the sound by reflection between the confining surfaces.

One word about concrete construction, as that is coming into more and more general use. Concrete itself is a rigid material and when it sets, it is as hard as stone, but it is composed of a multitude of pieces bound together with a different material, namely, cement and sand, so that sound in going through concrete dissipates itself to a certain extent in passing through these various changes of material. Likewise concrete is without fiber in any definite direction and the vibrating wave is in every direction with equal speed and force. Also in the concrete construction there are no reflecting surfaces as in the joist construction, consequently there is no chance for augmenting the sound. It seems also that from the very rigidity of concrete the sound vibratory motion set up by the impact of the foot on the concrete is much less than with the suspended wood floor; however, what sound wave there is travels much faster in concrete than in wood and it is a much more perfect conductor. For this reason if a number of sounds beat against a concrete slab at different points, those independent waves quickly come in contact with each other and there is a tendency of each wave to flatten out and change its direction of movement and its form. Therefore we get, on the other side indistinctness, many times almost silence, and in almost every case where there are a number of sounds, such a jumbling together that the listener is likely to be unconscious of any sound whatever. I find many architects and engineers contending that concrete construction is sound-proof. This is not true and a careful reading of this paragraph will show the reason why so many have regarded concrete as non-sound conducting. It is a construction that should not be used for flat buildings or school houses without the introduction of some nonvibrating material, a number of which are manufactured by a number of different companies, and which are fireproof and practical for use in almost every condition. In practical work, however, I do not deem it essential to sound deaden concrete in office or warehouse buildings where the noises which come through the windows or which are produced in the room itself are more or less great during the time that the building is occupied and where there is, as in the office building, a great diversity of sound being produced on all sides continuously, which tend to become indistinct and a jumble in being conducted through the concrete.

As with heat insulation, so with sound insulation, the matter is not understood past any question of doubt, but is still subject to a great deal more of careful experimentation and investigation.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

Residence at Jamestown, N. Y. E. G. W. Dietrich, Architect.

A Residence at Jamestown, N. Y.

THE building of a country or suburban residence entails the solving of a number of problems by the architect radically different from those met in city structures. There are few or no restrictions as to light, the building can be located to give good exposure to all sides and the window openings can be arranged for the best artistic effect instead of being made as large as possible to supply the required light and ventilation.

In the plans shown on the opposite page the architect has provided a house to meet the needs of the family in moderate circumstances in the suburban districts. Ample provision is made for the usual social functions, receptions, etc., as well as providing most admirably for the comfort of the family and guests.

There is more to planning a house than merely providing space for the various appointments. There must be an arrangement well thought out, providing communication between the different parts and at the same time there should not be any appearance of waste space. Too often we find large rooms utilizing practically the entire floor space but with insufficient halls and passageways. The stairs are too frequently too narrow and cramped. The flights are frequently too long and the landings too small. In the present house these troubles have been entirely eliminated and the entire appearance is one of comfort and dignity.

While the exterior does not necessarily bear much relation to the interior in the modern home, in this house the exterior indicates a modest and becoming dignity in keeping with the plans and the interior.

The Care of Materials

By G. D. CRAIN, JR.

ALTHOUGH the average owner who starts building a residence is still looking more closely at the cost of the job than at the quality of the material to be used in his work, it will probably not be gainsaid that public taste is advancing in the right direction, and that the efforts of architects and builders have been bearing fruit, in that better stuff is called for for use in interior finish, millwork and flooring than used to be the case.

Though the man who wants an oak finish for yellow pine prices is still to be found at the old stand, there are more people in evidence who demand the best and are willing to pay for it. At all events, while there is plenty of room for working toward higher standards along this line, the interest taken by the public in the creation of artistic and attractive interiors is such that the work of the man who designs and builds the home is much easier than when "Cut the cost" was the only slogan heard.

If the experience of a good many representative builders may be taken as a criterion of actual conditions, one would be warranted in stating that the most important feature to be considered just now is not so much the character of the material, but the way it is handled from the mill to the job. In other words, the satisfaction of the owner will be more nearly assured by the careful handling of the work than in any other way, for no matter how good the stock may be, it will not make a good appearance unless the workmanship is there.

Take, for instance, the matter of drying. If the millmen, contractors and builders could eliminate from their troubles those which have to do with keeping their woodwork in good condition, absolutely dry, so that they can leave a job without fearing that the material is going to shrink when the heat is turned into the pipes—if that could be done, the sum total of their worries would be considerably reduced.

Just as eternal vigilance is the price of liberty, so it is the price which must be paid to insure satisfaction from one end of the proposition to the other. And the manufacturer and the builder share the responsibility here, while the man who applies the finish after the work is installed must also assume some of the burden.

As far as the maker of interior finish is concerned, it is demanded of him, first, that the material which he uses be good, or at least come up to specifications. That must be secured to start with. After that it is a question of manufacture, and the turning out of good, substantial material that will stand the test of time is a job that some of the greatest business men in the country have successfully tackled. Generally speaking, the manufacturer is doing his part of the work well.

The condition of the stock, as far as dryness goes, is a proposition shared by both the millman and the builder. The former must use nothing but material that has been carefully kiln-dried in its manufacture, and after the work has been finished and stored it must be kept in a warehouse with the atmosphere at a temperature which will insure the continued good condition of the material. A warehouse may be ever so well built and tight so that the millwork and interior finish will not be directly exposed to the weather, but unless it is heated and the temperature maintained evenly there is likely to be danger of its absorbing moisture. And that always causes trouble.

In a good many cases the manufacturer applies a coat of priming to his finished work in order to enable it better to resist the process of absorption. This is a good idea, and one which has been found to help the situation greatly, although it is not safe to assume that because it has this protection it will absorb absolutely no moisture. It is simply a factor of safety.

The builder who gets material from the factory should take just as careful precautions to keep it in good condition as did the man at the mill. Material of this sort should not be exposed, and yet one frequently sees a house in course of construction with high-grade interior finish, flooring and the like lying in places where it is certain that the elements would have full sway. In the first place, the material should not be brought to the job until it is ready to be used; and in the next, pending such action, the contractor should have a place where the stock

can be stored without danger of its taking up any moisture.

Unless weather conditions are unusually favorable, no woodwork should be installed unless the house is thoroughly warm and entirely enclosed. This is a difficult matter to arrange sometimes, and every builder knows the practical difficulties in the way of securing the desired condition. At the same time, however, seeing to it that these conditions are complied with not infrequently insures satisfactory work in place of a result that is satisfactory neither to the contractor, the architect nor the owner.

Suppose, for example, that the interior finish is permitted to lie where it will take up moisture. When the time comes to nail it in place, it will have swelled somewhat, although the difference will be so slight as not to be noticeable, unless one applies the rule. After the work is installed and the building is thoroughly heated, the moisture is driven out of the wood and what is the result? It draws apart, leaving ugly gaps which no amount of handsome finish will make up for.

There is also danger in this case of the contraction of the wood injuring the finish, causing it to crack and blister, while if veneered work is used the condition is likely to be accentuated. Built-up stock is stronger and more durable than most solid material, provided it is handled under proper conditions; but it will not do to permit it to absorb moisture and, therefore, in handling it as much care as can possibly be devoted to it should be exercised.

Some careful builders use gauges by which the amount of humidity in a building is determined. This is compared with the standard maintained in their warehouses. If there is more moisture than the material has been accustomed to, the builder makes a point of having the building heated until the excess humidity has been driven off before he attempts to do any work at all. Then, when operations are actually begun, he knows that the results will be pleasing to everybody concerned, and that he will not have to apologize for work which has shrunk and possibly warped.

The amount of attention being paid to interior finish nowadays, in connection with the character of the material and the sort of finish to be applied, makes the details of construction all the more important. It means that closer inspection is given to such work than when the interior finish was merely a matter of only casual interest. The careful builder will possibly spend a good deal of time and money in keeping his stock in good condition, but he will be well repaid for it when it comes to a question of doing quality work. The architect will remember, and so will the owner. Conversely, dissatisfaction which develops after the job is installed may have no direct expression at the time, since the job may have been accepted, but the result will be evidenced when other work is to be undertaken. Quality counts, after all.

Probably there is no department of interior work in which the factor of dryness of material is of more importance than in the case of hardwood flooring. The slightest shrinkage on the part of this material, caused either by green stock being used or the flooring taking up moisture before being put down, will immediately be made plain, for the floor is, of course, the most conspicuous part of the building. The finest quartered oak flooring or parquetry ever manufactured would not give satisfaction under those conditions, so that it is once again plain that the manufacturer cannot insure good work by himself; the builder who installs the material has just as large responsibility as the millman who produced the stock.

In the case of flooring, precautions as to keeping the building warm and tight while the work is going on are resorted to even more frequently. Some specialists in this kind of work find it advantageous to use portable charcoal heaters for the purpose of drying out rooms which may not be thoroughly free of excess moisture. Owing to the fact that flooring is seldom primed, since the finish has to be secured after the work is in place, it takes up moisture more readily than most other kinds of woodwork and, therefore, any incorrectness in the alignment or any warping or swelling is immediately discernible.

In this connection, it is just as important that the surface over which the flooring is laid down should be dry, as it is that the upper stratum shall be in good condition, for if the base is green the moisture will sooner or later be communicated to the flooring above, causing it to swell and warp.

Roof Framing

By A. A. STAFFORD.

IT HAS been noticed in some localities where it was necessary to work out some curved rafters, men would take a board for pattern, laying it down on the ground or floor and get a long stick for radius, not having any blueprint drawing to show what length the radius should be. They begin

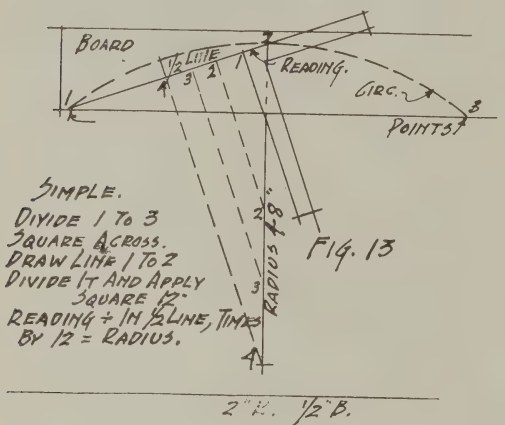
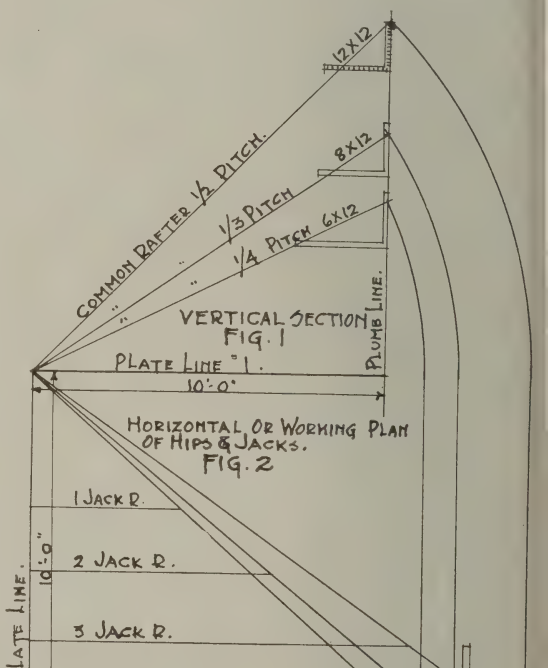


Fig. 13

to guess the length and move the sweep stick and the board and change the length and change their mind until they are dizzy. After a while they will find the length of radius touching the three points they must have. Now the method of using this long sweep for radius is very good, but first get its length by the use of the square and a few figures. The top and bottom points are fixed, you fix the center one according to what curve you want. It does not matter what it may be.

Take a good straight edge board for pattern and lay it out as in Figure 13 and it is very easy to get the length of radius that hits the three necessary points from exact center on edge of rafter, square across. This is center radius lines to a point as far in as you cut. From this point make a straight line to one end where the curve line will come to, see Figure 13, how the square lays. At just one-half of this line is a line at right angles to it. This line crosses the center radius line just far enough away from circle to be the radius. Now to get this with the square and a few figures, treat it like you would common rafter, the center radius, the run, the half line, the rise. Place the square as in figure 13 with 12″ on run. Note the reading on tongue. Just as many times as this reading is contained in the half line just so many feet or fractions thereof you must have on the radius stick or line. To explain, suppose the reading was 3″ on tongue and the half line was 20″. Three is in 20 6⅔ times, the radius would then be 6⅔′ = 6′ 8″. Set trammel and with board flat down, fasten the middle and place point there with the other end of the trammel fast. Swing it and the one end of board to meet. If no mistake has been made, the other end of board will be right. Prove it very quickly by swinging trammel there.

Study the drawing and don't stop at the

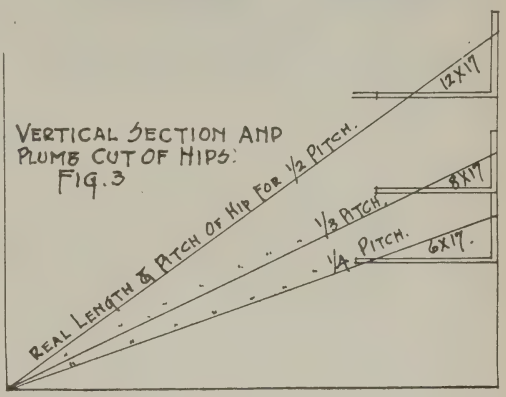


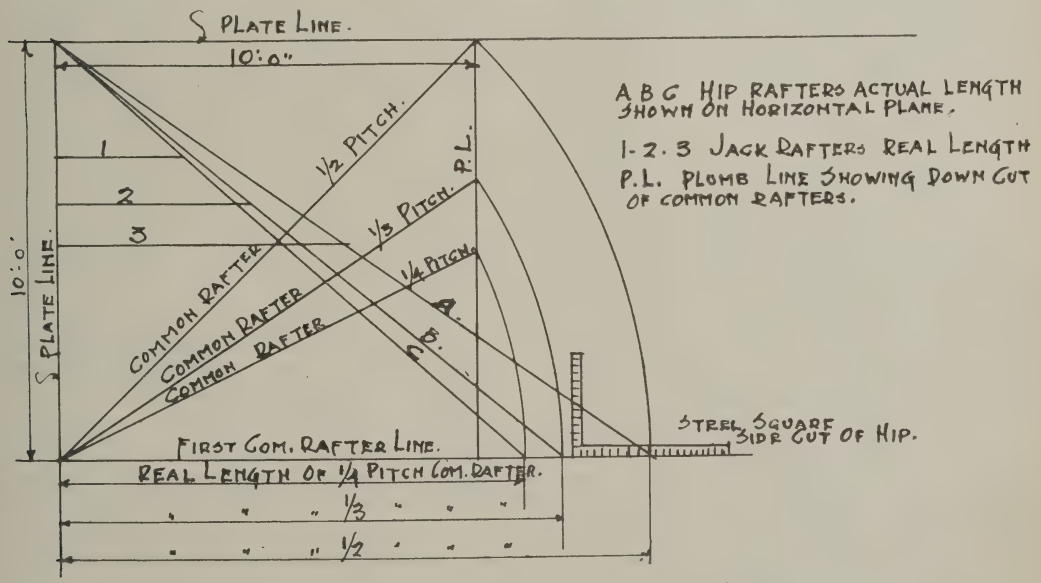
reading of these problems. Illustrate them yourself and impress on your mind, even if you never have to put them to practical use.

Lengths of Rafters

By J. E. TRUITT.

AS there seems to be no end to the discussion as to the manner of obtaining the lengths of hip rafters, and the methods of hip roof framing, these sketches seem to me to be an easy explanation how to get lengths and bevels for common, hip, and jack rafters. The common rafters in cut showing the three pitches, ¼, ⅓ and ½ are shown as resting on plate at point where the first common rafter must be in a square or regular hip. The curved lines descending from the peaks, that is, from the top point of common rafters, to the line of first common rafter where they intersect with the peak of the hips A, B, and C which latter (the hips), are shown in horizontal plane or just as they would be in a working plan. The common rafters are shown as elevated or in normal position, but the curved lines show exactly where their peaks would come to were they lowered to the horizontal or level plane as are the hips. P. L. shows the plumb line or down cut of common rafters, and the lines on lower side of drawing show their real length, the first thing to find out when starting to frame a hip roof. 1, 2 and 3 show the jacks. The points of intersection with the hips of course show bevel for the side cuts, while the plumb and bottom cuts for ⅓ pitch jack is obviously the same as for a common rafter of same pitch. The Steel Square shows side cut of hip for ½ pitch, the side cut for jack to match will be the same. By moving the square on down "first common rafter line" it will give the side cuts for the other hips and at the same time, as before mentioned, give the side cut for the jacks.





The plumb or down cut of hips is shown in Figure 2. This sketch is intended to represent one corner of a structure twenty feet wide. The steel squares and the drawings should make the problem plain.

OUR READERS PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Ed.]

Answers

DUTIES OF A FOREMAN.

By I. P. H., Omaha, Neb.

The question from J. A. B., Lake Megantic, Que., in regard to what one should know in order to be successful as a carpenter foreman, is a very deep and broad question. A question that requires a lengthy reply, for it must be apparent to everybody that to be a real successful carpenter foreman, the foreman must be well versed in everything pertaining to the building trades. In fact there is no possibility of his knowing too much if he has always the good judgment to use his knowledge just at the proper time and place. The foreman don't want to be more nice than wise about things nor penny wise and pound foolish.

To be successful he must be a practical man; be able to grasp any situation that comes up and quickly find a way to overcome all obstacles the building trades have to contend with in the best possible manner. The obstacles that are met with in the buildings are many and are of every-day occurrence, and it is up to the foreman to know how to dispose of them in the best manner. One of the chief duties of the foreman is to watch the work and see that everything goes, and that it goes right. He must be able to show the men, when they need it, the best and quickest way of doing work. This is one essential, for a successful foreman must make money for the boss or the boss can't afford to keep him. The foreman must be able to direct the work of the men to the best advantage. He must not let the men get bunched up on the job. When more men than necessary to do the work get into close quarters, the contractor loses thereby. Keep just men enough in a place to do the work without getting in each other's way and no more. Success means much more than merely knowing how the work ought to be done, it means how to do it with neatness and dispatch, how to get the best and most work out of the men employed for the least money. To do this the foreman must closely watch every detail of the work as it progresses. He must take the most advantageous ways of doing all work, and not lose out on any part of it.

The foreman needs to be well posted so that mistakes are not of frequent occurrence. Don't claim to be perfect and not make any mistakes, for that kind of a chap never does anything. Everybody who works will sometime make a mistake, but if mistakes are of common occurrence, it is a sure sign of ignorance and that the party does not know any better, so watch the work closely and keep things going right to the best of your ability. Some mistakes will be made, and if they are not of too serious a kind they serve as sort of an educator, for a wise man will profit some by his experience, so that he will not make the same or a similar mistake the second time.

The foreman must know about the plumbing, the tinning, the furnace, hot water and steam heating, electric wiring and all of these things so that he can direct these men in the layout of the pipes and wires in order to keep each in their proper place. It frequently happens that the plumber and the furnace men get into regular mix up with their pipes, one getting in the way of the other. This can be avoided if the foreman understands the proper layout of the pipes. It will not do to let these sub-contractors come on a job and run things to suit their own convenience, they always breed trouble if this is allowed. The carpenter foreman should be competent to supervise the layout of all the work and see that there is no interference in the different departments.

All sub-contractors, such as plumbers, tinners, furnace men, electricians, etc., should be subject to the foreman's orders, even to his stopping their work if it should be necessary. The bosses who hire competent foremen and give them full authority over all the men employed have the least bother and meet with the greatest success. Here is the advantage of giving the foreman full authority on the job. When the foreman has full authority it makes him solely responsible for the work being correctly done and that it is done in a reasonable time as regards to cost, etc. The foreman can not afford to have things go wrong or let the work lag, either one reflects on his ability as manager of the work and the men working under him. This is the only way to make a real good foreman. Make him responsible and if he has any ginger in him, you will see that he is always on the lookout to see that the work goes as it should. On the other hand a foreman who is only a half-way foreman soon falls into a sort of a don't care way of working, and all the men under him fall in line and most everything goes wrong on the job or else it does not seem to go at all.

The foreman should have authority to discharge any of his men for cause. He can't afford to keep a man on the job who is not earning his money, because it reflects on his judgment and management as a foreman. Contractors will do well to get the best foremen they can and give them full authority over the men so that they do not have to keep any man on the job who is not up to the average in the quality and amount of work he can do. This is what makes successful foremen and successful contracting.

No new man at the business can start out and have as good success as those who have had the experience, but this should not discourage anyone from making the start, for we all have to learn our business and nothing is learned from standing back. So hop to it, keep your eyes and ears open and learn all you can about the business you wish to master, and if you're made up of the right kind of stuff you will be sure to meet with a fare share of success.

STRESS ON BEARING PILES.

From "Building Engineer," Brooklyn, N. Y.

For the benefit of W. T. Watt, Calgary, Alberta, I submit a few notes on the bearing stress of piles. The Common Formula for safe load on piles is:

$$\text{Safe load in cwts.} = \frac{W\ h}{8\ d},$$

where W = weight of ram in cwts., h = height fallen through by ram in inches, and d = distance driven by last blow in inches. There are about twenty-five other formulæ more or less reliable, but an actual test is generally made upon important works. The Safe Load on Bearing Piles may reach a maximum of 1,000 lb. per sq. in., but it should in general be limited to 2½ cwt. per sq. in., or 18 tons on a 12 × 12 pile. Friction piles may support from 1½ to 2 cwt. per sq. in. of section. In clay or wet soils it is not advisable to trust a greater weight than 12 tons upon each pile, but in gravel there is scarcely any limit to the vertical bearing strength of a pile.

The Strength of Screw Piles depends on the nature of the strata into which they are screwed; they are generally treated as bearing piles, the friction of the shaft being neglected in considering their strength. A wide margin of safety should be adopted, as a pile will often sink steadily under a heavy quiescent pressure applied continuously when it withstood perfectly a corresponding sudden blow of the ram. This is especially so with clays. Then again, the vibrations of the structure may in time produce unexpected settlements, as clayey soils may become wet adjoining the piles and lessen the friction. F, the factor of safety, is best at 1/3 to 1/5 for temporary or light work, 1/6 to 1/10 for permanent work, especially when subject to vibrations. For very important work, or in uncertain and unreliable ground, this even should be increased.

FOOTING AND WALLS.

From "Country Builder," Erie, Pa., answering H. A. C., St. Louis, Mo.

Footing or basement walls for ordinary frame buildings should not be less than one foot thick. The price of walls in either concrete, brick or stone, per cubic foot, will not vary much, but it is impossible to give a price per foot that will be approximately correct owing to prices being in variance in different localities. Why not get a good book on pricing and estimating? There is no need of any anchorage other than bedding the sill in

good mortar, laid on the top of foundation walls.

TIME CARDS.

H. M. S., Manchester Center, Vt.

I see in some of the last issues systems for keeping time on job work. I enclose one of

TIME CARD

FOR

H. M. SWIFT, Builder,

Manchester Center, Vt.

For Week Ending Friday_____191

Name_____

	Where worked	
Sat.	Time	
	What on	
	Where worked	
Mon.	Time	
	What on	
	Where worked	
Tues.	Time	
	What on	
	Where worked	
Wed.	Time	
	What on	
	Where worked	
Thurs.	Time	
	What on	
	Where worked	
Fri.	Time	
	What on	
Rate	*Total No. of hours,*	$
	Cash Received on the above,	$
	Balance due	$

Rec'd. Payment

my time cards which is very simple and answers the purpose in this section. I keep the stock bill on the back side. I make this card 5½ inches wide by about 9½ inches high.

PAINTING ESTIMATES.

From "Viny," South Bend, Ind.

Replying to M. M. of Detroit, the safest way is to estimate by the yard. You will have some standard quality of work given in the specifications from which you can determine the price per yard, then find out how many yards—superficial—there are in the building of that particular style of work. Then multiply the total number of yards by the price of a single yard, which will give you the amount in full. For varnishing, graining or other extra word, assess the price of the extra work per yard. For getting the number of yards of painting on windows, doors and sashes, measure one window, using a tape line which can be pressed into the hollows and quirks, and bent around the projecting members of the mouldings and other parts of the jambs, stiles and panels. Count the windows, and doors that are all of one size, and finished alike, and the price of one, multiplied by the number of either doors or windows will figure the amount. Windows including glazing and "cutting in" are often charged by the piece, and the price is generally governed by local rules, just as the "per yard" is, and this varies with the localities. If further information is required, write again.

ESTIMATING CARPENTRY.

From "Bill Woods," Montclair, N. J.

If "T. J. E." will get a few books on estimating, he will get more information from them than it is possible to give in the space given to correspondents in this, or any other journal. There are a number of good books on the subject, such as "Brant's Lightning Estimater," "Arthur's Estimator," "Hodgson's Estimator," and others. Hodgson's work is the one I make use of, and find it reliable and quite easy to understand, for all kinds of work in the building line.

VALLEY RAFTERS FOR TWO-PITCH ROOFS.

From J. M. Q., Bonham, Texas, answering W. H. I.

I have been in the building trade twenty years and have been up against some tough propositions in roof framing and I find that in all cases the only correct way to frame any roof is to first find run and rise of rafter and second take run on body and rise on arm of square and by all means stay with your square. This will give you both length and cuts.

DUTIES OF A FOREMAN.

From "An Old Foreman," Omaha, Neb.

It would fill a pretty large book to write down and state all "J. A. B.," of Lake Megantic asks for, and then, if he didn't have the proper quality and quantity of brains, the knowledge would be of little use to him. In the first place he should know all about his trade; secondly, he should be a fairly good workman so that the men under him will feel he knows of what he speaks. Next, he should have a pretty thorough knowledge of

construction, should be "up to" all the various methods of performing work, should know the qualities of the materials he makes use of, and when and how and where they should be used. He should be a reader, a keen observer of men and things, should take several magazines that deal with his calling, and should be able to get the good will of the men under him and retain it. The average foreman makes many blunders in his first years, but, if he is willing to learn, he will gain experience with age and discover that more and better work will be done by men on whom some consideration is expended. Avoid browbeating, swearing, driving, and useless faultfinding. The worst fault a foreman can have is a "swelled head."

DUTIES OF A FOREMAN.

From O. R., Chicago, answering J. A. B.

As to the duties you are called upon to fulfill at all times, plan your work so the men you are handling have plenty of work in sight. Then they will always work more to your advantage. Learn to be able to anticipate the time necessary to get material on the ground so you will never run short and have to lay good men off, then the fault is yours, not theirs.

Young foremen are liable to get overbearing. Be quiet, civil, good natured, teach your men to respect you, not to fear you. Men who fear you never work well. If you fail in these respects, your chances are hopeless.

Be firm when you know you are right, even to your superiors, and always ready to hear good advice even from your laborers.

Don't make pets of any one. Use every man alike and if you have had a proper training in your line of business, you cannot help but succeed.

STUCCO CONSTRUCTION.

From "Architect," Buffalo, N. Y.

D. D. S., Rock Springs, Wyo., should use expanded metal lath for his stucco work. Make your frame just as you would any frame. Board the outside with surfaced lumber, cover with your paper, lapping joints well over. Use wood furring from half to one inch in thickness and not more than 1¼ inches wide. Space off furring to suit—but not more than 18 inches from centers. Nail the metal lath to the furring—with prepared nails or staples if you can procure them; this is not absolutely necessary, however, as other nails will do very well. Plaster over this in the usual way.

RESETTING LEVEL TUBE.

From "Taylor," Dayton, Ohio.

Replying to O. A. Y., I may say he can take out the glass tube if he goes to work carefully and cuts the plaster nicely with a pointed knife. He must not press against the glass, as it is quite thin, and easily broken. When the glass is out, make a thin paste with fine plaster of Paris and clear water. Stand the level on some perfectly level place, then put in the space where the tube was taken out, sufficient of the paste to allow the tube to set in place, and adjust the bulb to the exact level, seeing that the bulb is below the brass cover, so that when the cover is screwed on, it will not press on the glass. Let level stand on the level base until the whole is dry. If there is a "plumb" tube running across the level, and it is in working order, you need no plumb-bob.

RE-SETTING A LEVEL TUBE.

From M. A. C., Chicago:

Replying to O. A. Y., Loudonville, O. It is perfectly feasible to take out the level tube from a carpenter's level, but you have to be very careful not to break the glass, as it is very thin. The glass is set in plaster of paris. You can moisten the plaster and take it out carefully with a knife. Clean out all the plaster and attach the level by blocking the tube into the slot as near level as possible, and then reversing the level. You can then raise or lower one end one-half of the distance necessary to correct the error. After a number of trials, you will find that the level is perfectly true. You must be careful to obtain a perfectly level and solid surface to work on and keep the level always in exactly the same position on the bench. For instance, drive a nail to lay the end of the level against, and then drive two nails to rest the level on. The tube can be blocked in by wrapping a piece of twine around the ends so that it fits snugly and this will allow you to raise and lower the tube as required. The tube is not straight, but is curved and the outside curve must be kept on top. On some levels there is a pair of lines etched, which indicate the top or the center of the tube. Keep the tube as near the top of the slide as possible for easy reading.

When you have the level exactly right,

carefully fill the slot with plaster of paris, mixed with just enough water to make a thick cream, and let it stand until hard before touching it. As soon as the plaster is set and before it is perfectly dry, carefully trim off the superfluous plaster and twine. You must not be disappointed if you have to do this two or three times before you can get the level perfectly true.

A mason's level and plumb is used exactly as a carpenter would use a level, except that the plumb bob is used for working on vertical surfaces. The object of the bob is to make the reading easier and also to allow the mason to lay out splayed work.

In using the plumbing bob, the line from the saw cut at the top to the bottom or to the hole where the plumb hangs must be perfectly parallel to both sides of the level in order to insure accurate work, and the work is plumbed by simply keeping the plumb line exactly over the line cut in the level.

Questions

VENTILATING SOIL PIPES.

From "Amateur Plumber."

I want to put a soil pipe leading from a toilet and bath room, and want to have the pipe properly ventilated. Please, some one, give me a little advice on the subject.

PLASTERING.

From "Wm. G.," Chicago, Ill.

I would feel greatly obliged if one or more of my fellow readers would be kind enough to give me some information on how to start contracting for plaster work. What amount of money would be necessary to start with? If I figured on a job of work and wanted to send in an estimate, what steps should I take in order to have an equal chance with others in getting the work? Is there any advantage in getting bill heads, or other printed matter made, for contracting purposes? Any information on the subject will be gratefully received.

THE ORDERS OF ARCHITECTURE.

From "A Youthful Carpenter," Nelson, B. C.

Will you kindly publish a plain understanding article on the proportions and styles of a few of the most used "Orders of Architecture," with necessary illustrations? In this country few people seem to know very much about architectural orders.

INLAYING.

From "Tubal Cain," Chicago, Ill.

Some months ago you had a very nice answer to a subscriber who asked for some "pointers" on the subject of "Inlaying," and as I am about to take up the art I would be pleased to see some further remarks, with illustrations, regarding it, if some fellow reader will be kind enough to favor me and others. Perhaps the Editor may publish a paper or two on this matter, which I am sure would be welcomed by many readers, as well as myself.

BRICK, CONCRETE, OR RUBBLE.

From T., H., Pittsburgh, Pa.

Will you kindly state in the next issue of The National Builder which of the following walls is the best for a cellar foundation for a two-story brick dwelling house of eight rooms? Also state the thickness the walls should be and the cost of each.

TILTING FLOUR BIN.

From J. J. P., Hunterville, N. Z.

I would like to ask through the question column of The National Builder if one of your many readers will give me details of a "tip forward" flour bin.

I cannot value The National Builder too highly; it fills a long-felt want with me and keeps me quite in touch with up-to-date methods in the building line.

In that respect, I consider it superior to English building magazines, as the class of buildings and general work in which it deals is so applicable to New Zealand conditions.

CONCRETE REFRIGERATOR.

From A. O. P., Eastwood, Minn.:

I want a refrigerator made out of concrete, about 10x10 ft., proper height with double air chambers. What would be the proper thickness of the walls and ceiling? How would you go about to build it? I do not want to use blocks. Any information on this subject will be greatly appreciated.

Book Notices

Notice.—All books noticed in these columns may be obtained from this office at Publishers' prices. All postage or express prepaid. (Money and address must accompany all orders.)

Modern Illumination, Theory and Practice. A handbook of practical information for the use of electric light men, architects, contractors and electricians, and every person who may, in any way, be concerned in the production or use of electricity for lighting purposes. By Henry C. Horstman and Victor H. Tousley. Published by Frederick J. Drake & Co., Chicago, Ill.; 275 pages, well illustrated, bound in fine green leather, burnished edges, gilt title, round corners and firmly and strongly put together. Price, postpaid, $2.00.

We do not know of any book in the market suited to the wants of electricians, or any one concerned with that department of science in a practical way, that offers such good, useful and instructive information as does the book before us. Indeed, the work has been designed from its initial page to the last word, more for the practical workman than the theorist, and nearly everything, big or little, is described, explained and illustrated and put in so simple a manner that the dullest capacity may gather in the sense and full meaning of the ideas the authors intended to convey. Indeed, it may be said of this book "that he who runs may read and understand," and this alone gives it a value to the operator much greater than a high-faluting work could possibly possess. Scientific terms, bewildering expressions and troublesome formulæ are kept within the narrowest limits that thoroughness and efficiency will admit. The student of electricity, however, will find between its covers a large amount of high class information, made valuable because of its being based on results obtained from actual experience. Do you desire to understand the nature of light and its qualities? You will find it explained here. Do you wish to become acquainted with the principles of vision? Are you desirous of being able to calculate reflections, refraction and diffusion of light? Would you care to understand all the various methods for calculating and making tables for the proper distribution of light? Have you not a desire to know all about arc lights, incandescent lights, Moore's tubes, and other lights? If you care to have a lot of practical knowledge regarding wiring buildings of all kinds, choice of lamps and other fixtures, including tables for any matters connected with electricity, search this book. Do you wish to discover the intensities in foot candles for various purposes and the manner of discovery? "Inquire within!" Would you care to be able to make your own plans, specifications and diagrams for wiring? If you would like to receive correct answers to all of these queries and hundreds of others, you will find them in this volume, rendered in such language that we think you will have no difficulty in comprehending. We have not space at our command to say of this book, in a commendatory way, all we could, and if we had, it is doubtful if we could do it justice. The book is a fine specimen of utility bookmaking, and is a credit to the publisher and bookmaker, as it seems to have been designed with a view to its wearing quality in paper and fine artistic appearance, and for a book of this kind, it would be difficult to excel. To those of our readers who are interested in electric matters, we cannot do less than recommend it to their attention, feeling sure we are doing them a service which they will appreciate.

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Drafting Instruments and How to Use Them. Prepared for manual training schools and beginners in drafting. By Ralph F. Windoes, director of manual training school, South Haven, Mich. Author of "A Builder's Course in Architectural Drawing," "The Home Craftsman," etc., 64 pages, 8x10 inches. Upwards of 80 plates and illustrations, printed on fine paper and well bound in fine cloth. Published by the author. Price, prepaid, cloth, 75 cents; paper, 50 cents.

Most readers are well acquainted with the author of this very useful work, and know from experience that anything from his pen will be of a thoroughly useful and practical nature. His contributions to The National Builder met with a hearty appreciation by his many readers, and we are sure this new production of his will be welcomed by our patrons with as much favor as were his serial contributions, and we predict for it a fairly good sale. The instructions given in the work for the proper using of instruments are simply put and given in such a style that any ordinary intelligence should be able to grasp. The instruments, their separate uses and their care, all modern appliances for making and reproducing drawings, and methods for preparing drawings for photogravure are shown and described. The young draftsman will derive much benefit by a careful study of this book.

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Building Structures in Earthquake Countries. By Ing. Alfredo Montel, translated from the Italian, with additions by the author. 126 pages, 7x9 inches, 42 diagrams in the text and one plate. Published by J. B. Lippincott Company, Philadelphia, Pa. Price, prepaid, $3.00.

This book may be said to have opened up a new field in this country for a display of constructional and inventive ingenuity in the way of protecting buildings intended to be erected in earthquake zones. While Japan easily leads in the production of works on this line, Italy follows closely and has given us several good books and many papers on the subject, and our magazines and scientific papers have not

been behind in adding their quota to the stock of knowledge on the subject, but no single work on this subject, so far as we can discover, has ever been published in any country that covers the ground as extensively as this does, or deals with it in so practical and scientific a manner. The opening remarks on the probable action of active earthquakes, their results and consequences and some suggestions for safeguarding lives, are worthy of the consideration of every person who lives in a shaky zone, or who builds or fits up structures of any kind in district where "quakes" may occur.

Many of the illustrations and diagrams shown exhibit methods of construction that are proof against the destructive forces of "earthquakes," and should prove of great service to architects and builders in localities liable to be shaken up and it seems to us that every man employed in the building trades along the Pacific Coast, in the Philippines, Hawaii, Porto Rico, and other West Indian islands, Mexico, Central and South America, should have a copy of this work on his book shelves, as from it he may learn much that will be to his advantage and that may be the means of preventing loss of life and destruction of property. If space permitted we could say more of a favorable character, for we feel the volume is entitled to it.

The work is printed on excellent paper and is well bound in maroon cloth.

* * *

A very artistic and useful magazine published in Seattle has reached our desk this month. The new journal is named "Bungalow Magazine," and is an illustrated monthly devoted exclusively to artistic bungalow homes and is published by The Bungalow Publishing Company, Seattle, Wash., U. S. A., $2.00 a year, 20 cents per copy.

The number before us (No. 1) makes a very fine beginning and if subsequent issues maintain the same standard it will be deserving of success.

* * *

The June issue, 1912, of "The Architectural Quarterly of Harvard University" came to hand some time ago. It is a beautifully gotten up publication, finely illustrated with twelve separate full size plates of plans, elevations and sections of architectural subjects. This publication is issued by Harvard University, Cambridge, Mass., under the direction of the School of Architecture. The Architectural Quarterly of Harvard University will be issued in March, June, September and December of each year. Annual subscription, one dollar and a half, payable in advance. Single numbers fifty cents.

Patents

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

1,031,897. Building block mold. R. C. Williamson, Carlisle, Iowa.

87,311. Certain construction materials. Barrett Manufacturing Company, New York City.

87,382. Certain construction materials. United States Gypsum Company, Jersey City, N. J., and Chicago, Ill.

1,032,646. Water heater, A. Beler, assor. Beler Water Heater Co., Pittsburgh, Pa.

1,032,669. Roofing implement. Wm. B. Grischy, Cincinnati, Ohio.

1,032,752. Window. Fred J. Gruhl, Milwaukee, Wis.

1,032,825. Drop window. M. Halasz, Budapest, Austria-Hungary.

1,032,856. Tension member for concrete construction. E. N. Pagelsen, assor. by mesne assignments. T. W. Jenks, Pittsburgh, Pa.

1,033,694. Metal weather strip. P. L. Hedberg, assor. Chicago. Metal Weather Strip Company, Chicago, Ill.

1,033,106. Building construction. J. Kahn, assor. Trussed Concrete Steel Company, Detroit, Mich.

1,033,413. Floor construction. J. Kahn, assor. Trussed Concrete Steel Company.

1,033,414. Structural member. J. Kahn, assor. Trussed Concrete Steel Company.

1,033,177. Door hanger. J. L. Kail, Chicago, Ill.

1,033,255. Door securer. A. Lochhead, San Francisco, Cal.

1,033,461. Hollow wall molding system. E. O. Peterson, Elgin, Neb.

1,033,218. Appliance for mixing the ingredients of concrete, etc. Jno. W. Twinberrow, Worcester, England.

1,033,792. Water closet. Rochester, N. Y. Edwin P. Gaylord.

1,034,361. Rolling flanged metal beams or bars. H. Grey, New York City.

1,033,797. Reinforcement system for concrete structures. R. B. Hartman, Milwaukee, Wis.

1,033,798. Core for hollow concrete structures. R. B. Hartman, Milwaukee, Wis.

1,033,805. Ventilator for buildings and vessels. T. Kernchen, Rendsburg, Germany.

1,034,277. Reinforced concrete piling. Wm. Mueser, New York City.

1,033,826. Reinforced concrete floor. J. S. Nolan, Highland Park, Ill.

1,033,954. Brick laying machine. M. G. Schindler (L. P.), Hamburg, Germany.

Trademarks.

87,586. Metal pipes, gutters, etc. American Metal Stamping Company, Germantown, Pa.

87,614. Certain named construction material. Farley & Loetscher Manufacturing Company, Dubuque, Iowa.

LEGAL DECISIONS

OF INTEREST TO BUILDERS

Prepared for the
NATIONAL BUILDER
by George H. Murdock

Where an owner refuses to permit a contractor to perform his part of a contract, the contractor, not waiving the breach, could recover the resulting damages.—Beattie v. New York, N. H. & H. R. R. Co. et al., 80 A. (Conn.) 709.

A lien must comply substantially with the requirements of the statute, but the exact words of the statute need not be used; certainty to a common intent being sufficient.—Wertz v. Lamb et al., 117 P. (Mont.) 89.

Under Gen. St. 1902, Sec. 4138, limiting mechanics' liens, a subcontractor is not entitled to a lien where the contractor has been properly paid the full contract price.—Kelly v. Alling et al., 80 A. (Conn.) 782.

The decisions of an architect, authorized by a building contract to determine practical questions of performance arising during the progress of the work, are binding on the parties, where he acts honestly and with reasonable efficiency.—Evans et al. v. Middlesex County, 95 N. E. (Mass.) 897.

Where a mechanic's lien is invalid, but the plaintiff, suing to establish it, states a cause of action for money due and the proof sustains it, he is entitled to a personal judgment, and it is error to grant a non-suit.—117 P. (Mont.) 89.

Where a building contractor carried out the contract under the direction of the owners and with their knowledge, the mere fact that the owners or their agents incurred expenses in excess of the expenditure anticipated by a majority of the owners when undertaking the work did not prevent a recovery by the contractor.—John V. Schaefer, Jr., & Co. v. Ely et al., 80 A. (Conn.), 775.

Provision in a building contract for payments "weekly as the work progresses, and in full when done," entitles the contractor to payments weekly to cover his outlay for labor and material, not exceeding the contract price, and to any balance remaining due on the completion of the work.—Kelly v. Alling et al., 80 A. (Conn.) 782.

Where, after a fire which destroys a building under construction, a substantial part of the structure remains, a lien exists for work done and material furnished on the building, even though the language of the mechanic's lien law contemplates a lien upon the structure as well as the land.—Butler v. Ng Chung et al., 117 P. (Cal.) 512.

Where a contract between the original contractor and the owner is filed the right of material men to enforce liens against the owner depends on whether the original contractor had a money demand against the owner arising out of the contract, and where, when the building was destroyed by fire, the owner owed the original contractor a certain sum, material men were entitled to satisfy their claims out of such sum.—Butler v. Ng Chung et al., 117 P. (Cal.) 512.

The notice referred to in Gen. St. 1902, Sec. 4138, exempting an owner from liability to a subcontractor as to payments in good faith to the contractor before notice of the lien, is the notice prescribed by section 4137, informal notice orally or by letter being ineffectual; and hence, in a suit by a subcontractor to establish a lien, it is proper to exclude a question asked the owner as to when he first learned that plaintiff was doing work on the building.—Kelly v. Alling et al., 80 A. (Conn.) 782.

An architect who testifies to his familiarity with a contract and plans for the erection of a building and the changes therein, and with the work done, based on actual examination after work and on daily reports made in the regular course of business, is competent to give his conclusions as to comparisons between the work done and the contract and plans, without detailing at length the manner in which each item of the work done has been performed.—John V. Schaefer, Jr., & Co. v. Ely et al., 80 A. (Conn.) 775.

A provision in a contract for the erection of a building that, if it was wholly or partially destroyed by fire before completion, the loss should be sustained by the owner, who thereby agreed to carry insurance for the amount of labor and material as the work progressed, obviated the usual rule, which places the risk of fire upon the contractor, and required the owner to insure for the mutual benefit of himself and the contractor to the value of the labor and material rendered useless by fire.—Butler v. Ng Chung et al., 117 P. (Cal.) 512.

Building Material Price List

Revised to Date.

*Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red Cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

Dimensions,	Seattle, Wash., Corrected by F. T. Bradley. M ft. BM	Chicago, Corrected by J.H. Touchstone. M ft. BM S 2 S	Omaha, Neb., Corrected by I. P. Hicks. M ft. BM S 2 S	Southern Ontario, Corrected by F. O. Frantz. M ft. BM S 2 S
2"x4" to 8" up to 16', No. 1	$11.00	$20.00	yp $26.00	h $24.00
2"x4" to 8" up to 16', No. 2		18.00	24.00	22.00
2"x4" to 8" 18 and 20', No. 1		21.05	27.00	26.00
2"x10" up to 16', No. 1	12.00	20.50	28.00	24.00
2"x12" up to 16', No. 1		21.50	30.00	25.00
2"x14" up to 16', No. 1	12.50	*	*	26.00
Each 2 ft. over 20 ft., add per M		1.00	1.00	2.00
Select stock as above, add per M	6.00	5.00	*	*
Exterior Finish, Etc.—		M ft. BM D 4 S	M ft. BM D 4 S	M ft. BM D 4 S
1"x3" to 1"x8", No. 1	30.00	yp $32.00	yp $45.00	wp $35.00
1"x16", No. 1	39.00	32.00	43.00	40.00
1"x12", No. 1	35.00	37.00	46.00	42.00
1¼"x3" to 1¼"x12", No. 1		45.00	48.00	45.00
1½" and 2" same as above		42.00	48.00	42.00
1" drop siding, No. 1	25.00	24.00	30.00	30.00
½" lap siding, No. 1 cedar	25.00	*	rdw 30.00	30.00
Enclosing and Fence Boards—		M ft. BM S 1 S	M ft. BM S 1 S	M ft. BM S 1 S
1"x4" to 1"x8", No. 1		yp $23.00	yp $25.00	wp $30.00
1"x8" to 1"x12", No. 1	11.00	23.00	24.00	h 24.00
1"x16", No. 1		*	24.00	24.00
1"x16", No. 2	15.00	*	22.00	22.00
Interior Finish, Flooring, Ceiling, Etc.—		M ft. BM D S	M ft. BM D 4 S	M ft. BM D 4 S
½"x⅞", T. & G. Flooring, No. 1	30.00	yp $26.50	yp $38.00	wp $40.00
½", T. & G. Flooring, No. 2	27.00	*	34.00	wp 30.00
Ceiling per M	25.00	1.00	2.00	1.00
Partition per M	30.00	2.00	2.00	2.00
⅝"x4" Ceiling No 1	17.00	22.00	30.00	np 30.00
		100 ft. run	100 ft. run	100 ft. run
4¼" Moulded Casing	.02	yp $1.52	yp $2.00	wp $2.00
4¾" Moulded Casing	.02½	1.68	2.50	2.50
7¼" Moulded Base	.03	2.53	3.50	4.50
½"x9¼" Moulded Base		3.75	4.00	6.00
1½"x4½" Moulded Window Stool	.02½	2.12	3.00	4.00
Miscellaneous List—		Per M	Per M	Per M
Shingles, No. 1		rc $3.30	$4.00	bc rc $3.75
Shingles, No. 2		3.35	3.75	*
Shingles, fancy		W. C.	4.50	6.00
Lath, 4 ft., No. 1		yp 3.60	y 5.50	wp 5.00
Lath, 4 ft., No. 2		2.75	5.00	s 3.75
Pickets, 1"x3"x4' 6", dressed		35.00	30.00	*
Pickets, 1"x3"x4' 6", rough		*	*	*
		Piece	Piece	Piece
6"x8' Post split		Cdr $0.13	Cdr $0.25	*
8"x8' Post split		.17	.30	*
8"x8' Post whole		.66	.40	Cdr $0.30
6"x8' Post whole		.25	.35	.25
Hardware List—		Cw.	Cwt.	Cwt.
Nails, wire, common		$2.25	$3.00	$2.85
Nails, cut, common		2.10	*	3.00
Nails, wire, fine finishing		2.65	3.50	4.00
Sash Weights, cast iron		1.60	1.50	2.25
Tarred Felt Paper, best 2-ply		Roll $1.00	Roll $1.00	Roll *
Tarred Felt Paper, 3-ply			1.25	*
Red Rosin, Atlas brand			.90	$0.50
Red Rosin, durable brand			.75	.60
Black Neponset			*	2.50
Masons' Supplies—		Per M	Per M	Per M
Brick, blue, at kilns		*	*	*
Brick, blue, at kilns, No.		*	*	*
Brick, blue, at kilns, No. 2		$7.50	*	
Brick, white, delivered, face		7.00	*	*
Brick, red, delivered, backing		7.00	7.50	*
Brick, delivered, dry pressed		18.00	18.00	$17.00
Brick, vitrified, dry pressed		*	24.00	*
Lime, best gray		bbl. $1.30	bbl. $1.25	bbl. *
Lime, best white		1.40	1.25	1.80
Cement, Portland		.95	1.85	*
Plaster, calcined		2.40	1.80	bbl. $2.50
Hair, 8 lb. per bush		.25	.25	*

NOTE—While these figures are approximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

New York Prices for Lumber

	SPRUCE	L. L. Y. P.	S. L. Y. P.
2x2—2 x2½—2x3 2x4—2½x4 —3x4	Average price.....$29.00	.....$32.00	.....$26.00
2x6—2x7—2x8 3x6—3x7—3x8 4x6—4x8	19 feet and under.. 32.00 Over 19 feet..... 34.00	Up to 28 feet.. 30.00	Up to 28 feet.. 28.00
2x9—2x10—2x12 3x9—3x10—3x12	19 feet and over.. 34.00 Over 19 feet..... 37.00		
2x9—2x10 3x9—3x10 4x9—4x10		Up to 28 feet.. 33.00	Up to 28 feet.. 29.00
2x12— 4x12 3x12— 6x12 8x12—10x12—12x12		Up to 28 feet.. 33.00	Up to 28 feet.. 32.00
14-inch		Up to 28 feet.. 42.00	Up to 28 feet.. 36.00
16-inch		Up to 28 feet.. 48.00	
"Squares" (6x6—6x8—8x8—8x10—10x10)		Up to 28 feet.. 33.00	Up to 28 feet.. 30.00

⅞-in. and 1⅛-in. white pine cornice, sound knotted	55.00
⅞-in. and 1⅛-in. cypress cornice, clear	60.00
⅞-in. and 1⅛-in. cypress cornice, select	50.00
6-in. red cedar or redwood bevel siding, clear, 8 to 16 feet	30.00
6-in. white pine, clear, 12 to 16 feet	45.00
6-in. white pine, No. 2, 12 to 16 feet	40.00

ROOFING, T. & G., SHIP-LAP OR SQUARE EDGE.

⅞x5½-in. face, N. C. pine, 10 to 16 feet	25.00
⅞x7½-in. face, N. C. pine, 10 to 16 feet	26.00
⅞x9½-in. face, N. C. pine, 10 to 16 feet	26.00
1⅛x5½-in. face, N. C. pine, 10 to 16 feet	26.00
⅞x5½ to 7½-in. spruce	28.00
⅞x5½ to 7½-in. Hemlock	27.00

FLOORING.

⅞x2½ to 4½-in. N. C. pine, or yellow pine, flat grain, No. 1, 10 to 16 feet	33.00
⅞x2½ to 4½-in. N. C. pine, or yellor pine, flat grain, No. 2, 10 to 16 feet	28.00
⅞x2½ to 4½-in. N. C. pine, or yellow pine, flat grain, No. 3, 10 to 16 feet	22.00
⅞x2½-in. N. C. pine, comb grain, No. 1, 10 to 16 feet	47.00
⅞x2½-in. N. C. pine, comb grain, No. 2, 10 to 16 ft.	40.00
⅞x2½-in. yellow pine, comb grain, "A Heart," 10 to 16 feet	65.00
⅞x2½-in. yellow pine, comb grain, "A Sap," 10 to 16 feet	48.00
⅞-in. maple flooring, 2 feet and up, clear	48.00
⅞-in. maple flooring, 2 feet and up, No. 1	43.00
⅞-in. plain oak flooring, 2 feet and up, clear	65.00
⅞-in. plain oak flooring, 2 feet and up, selects	56.00
⅞-in. quartered oak flooring, 2 feet and up, clear	105.00

SHINGLES.

18-in. red cedar, "Eureka"	6.25
18-in. red cedar, "Perfection"	5.75
18-in. white cedar, XXXX	6.50
18-in. white cedar, clear butt	5.50
16-in. white cedar, extra	5.00
16-in. white cedar, clear butt	4.50
6x18-in. cypress, No. 1, Heart (on 6-in. basis)	11.00
6x18-in. cypress, No. 1, Sap or "A" (on 6-in. basis)	9.00
6x20-in. cypress, No. 1, Heart (on 6-in. basis)	14.00
6x20-in. silver gray cedar, No. 1 (on 6-in. basis)	18.00
6x20-in. silver gray cedar, "A" (on 6-in. basis)	15.00
6x20-in. silver gray cedar, Star (on 6-in. basis)	12.00

CEILING.

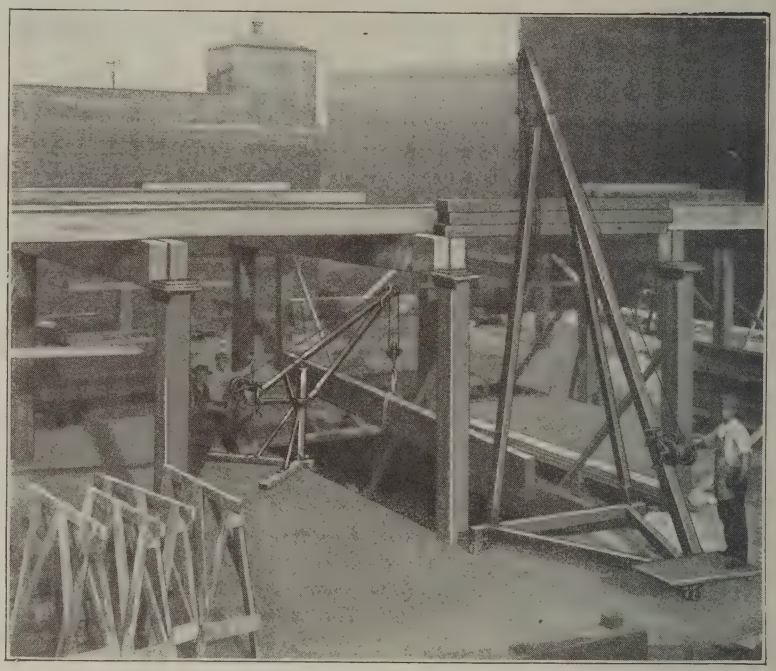
½-in. N. C. pine ceiling, clear, one side, 10 to 16 feet	27.00
½-in. N. C. pine ceiling, No. 2, one side, 10 to 16 feet	24.00
⅜-in. N. C. pine ceiling, clear, one side, 10 to 16 feet	24.00
⅞-in. N. C. pine ceiling, clear, one side, 10 to 16 feet	35.00
⅞-in. N. C. pine ceiling, clear, two sides, 10 to 16 feet	37.50
1⅛-in. N. C. pine ceiling, clear, one side, 10 to 16 feet	37.50
1⅛-in. N. C. pine ceiling, clear, two sides, 10 to 16 feet	40.00

	CYP.	Y. P.	W. P.
4¼-in. moulded casing	$2.75	$2.25	$3.30
4¼-in. moulded base	3.00	2.50	3.75

NOTE.—These prices are for less than car lots delivered on the job, within reasonable limits in New York, Brooklyn and the adjoining districts.

Trade Review

THE SASGEN DERRICK.



Few buildings are so small but that there is use for a derrick of the pattern made by Sasgen Brothers, 2053-57 Racine avenue, Chicago, Ill. With a derrick of this construction heavy timbers and beams are quickly set, columns can be put in place and miscellaneous material raised to the various floors. The cut on this page shows a large building recently erected in Chicago on which several Sasgen derricks were employed to keep the men in material, as well as to do the various heavy lifting.

Messrs. Sasgen Brothers have recently issued a catalogue showing in detail the various machines and apparatus which they manufacture, as well as describing some of the uses to which they may be put. This catalogue is of value to contractors and builders contemplating the erection of even small buildings, as there are always occasions when a heavy weight such as a footing stone, column base or piece of machinery must be raised or suspended for a short time. On such occasions a contractor feels that a Sasgen Derrick has paid for itself on one job.

The Sasgen catalogue is sent to our readers on request.

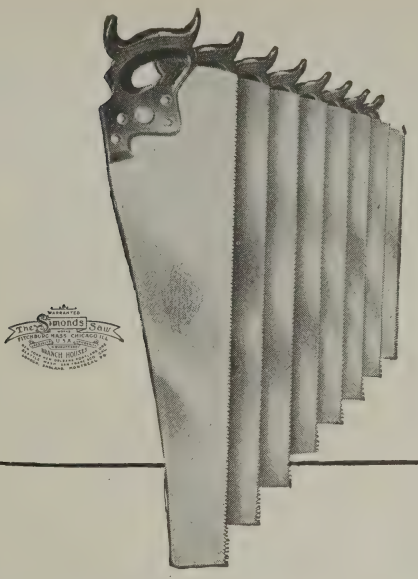
INTERIOR DECORATING.

The Alabastine Company is promoting a combination of decorating materials which has won favor with the trade, the practical man and the owner. The use of Alabastine and Alabasco in combination for home decoration is undeniably a success. Alabasco is a flat wall paint which can be washed with soap and water and sponge or cloth without any of the bad results that have been experienced with some other so-called "washable" wall paints. It is being used in public buildings, clubs, stores, schools and hospitals with most satisfactory results. Comes in the same beautiful tints as Alabastine. Alabastine has long been recognized as a superior wall coating, remarkable for its soft-hued tints. It is inexpensive, gives the user less trouble than kalsomines and the most satisfactory job all round.

The use of a washable wall paint is most desirable for certain walls, but to use it throughout the ordinary home is an unnecessary expense. Mr. Hamilton, general manager of the Alabastine Company, after long experimenting and a thorough trving-out, introduced this combination for the home. Alabastine for ceiling and side walls with the more expensive material—Alabasco—used only in such places as are exposed to extra wear, finger marks, etc. For example: Along the stairways, lower part of halls and bathrooms, below the plate rail in the dining-room and for nurseries; also for kitchen and cupboard walls, which require frequent sponging off.

This method enables the home-owner to keep the walls in a uniform condition and frees the decorator from the criticism that his work was not well done because it did not stand any wear, when in reality the carelessness of the people in the home caused the dissatisfaction. Every decorator will appreciate this way out of the difficulty of keeping customers satisfied and at a very slight additional expense over the old methods.

Contractors, painters, decorators, etc., who are interested in the newest things in decoration can receive the Alabastine circulars showing the tints and colors available by writing to the Alabastine Company, 737 N. B. Grandville road, Grand Rapids, Mich., and mentioning the National Builder.



WHEN YOU PAY $2.50

for a

SIMONDS HAND SAW

Blue Ribbon Brand

You are getting the best saw the market affords. There is really no need to pay more than that for a saw. At the same time, the expert Carpenter who wants the best tools to enable him to best do his work should have the best saw which can be made.

Now, the Simonds Blue Ribbon Brand Hand Saw is made of Simonds Steel. That is a sufficient guarantee that the saw is evenly tempered throughout all parts of the blade and that the teeth are made of a material which will enable them to take just the right amount of set and to hold a cutting edge in nice smooth shape throughout the longest time of cutting.

It means a saving of power, because the saw cuts easy. It means a saving of time because it requires less filing, and filing always means unproductive time.

An illustration does not show all the good features of this saw. We want you to see a sample. 26″ length, $2.50. Made sway-back and straight-back, either style you prefer. Furnished in either rip or cross-cut tooth. Any desired number of points to the inch.

Your Hardware Dealer can get you one of these saws if you want to take a look at it, and you don't need to take it unless you like it when once you have seen it. It is absolutely guaranteed.

Simonds Manufacturing Company

Fitchburg, Mass.	Chicago, Ill.	Montreal, Que.
New York City	New Orleans, La.	Seattle, Wash.
Portland, Ore.	San Francisco, Cal.	London, Eng.
Vancouver, B. C.	Lockport, N. Y.	St. John, N. B.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

LOCK JOINT STAVED COLUMNS

The above photograph shows the interior of the Presbyterian Church at St. Joseph, Mo. This cut shows the excellent appearance of the columns made by the Hartmann-Sanders Company, 2155 Elston avenue, Chicago.

The Hartmann-Sanders plant is well equipped for turning out work of this character, whether for interior of exterior use The growing popularity of atistic design in the ornamentation of modern homes is shown in the new catalogue which the Hartmann-Sanders Company has just issued.

This catalogue contains many excellent examples of interior and exterior columns and pilasters, pergolas, etc., and will be of interest to every contractor installing this class of work, as well as to the designer who is working up his drawings for artistic treatment. This catalogue is sent to our readers on request.

FIRE DOOR HARDWARE.

The advance in fireproof construction has caused a considerable diminution in the number of fires both from the external and internal hazard. In large buildings, however, as well as in smaller ones, it is necessary that all communicating doors be made fire resisting according to the best modern ideas. Insurance companies and fire experts have given this subject a great deal of thought and have promulgated various rules and regulations for the installation of doors, windows, etc., in buildings of fireproof construction.

A great deal of attention has been paid to the design and hardward of doors between different parts of buildings, as well as between floors. The operating devices must be such that they can be easily operated and yet such that they will close automatically in case of fire, thus confining the fire to a relatively limited area.

The Richards-Wilcox Manufacturing Company, Aurora, Ill., have recently issued a catalogue on Fire Door Hardware, which is one of the most complete books on this subject. The hardware for various sizes and styles of doors is shown in great detail, so that the catalogue becomes a reference book for the designer as well as for the contractor installing the doors.

We understand that the Richards-Wilcox Company will send this catalogue to our readers on request.

Fourteen Machines in One: 1—Fine Dimo-Grit wheel. 2—Coarse Dimo-Grit wheel. 3—Universal tool rest. 4—Chisel and plane bit guide. 5—Dimo-Grit razor hone. 6—Dimo-Grit scythe stone. 7—Dimo-Grit saw gummer. 8—Felt polishing wheel. 9—Medium Dimo-Grit wheel. 10—Cloth buffing wheel. 11—Dimo-Grit oil stone. 12—Dimo-Grit pocket hone. 13M—Plane bit honing attachment. 14M—Twist drill sharpening attachment.

FREE TO YOU

Handy Tool Grinder Makes Work Easy

I will send this shop tool grinding outfit to any reader of this magazine on 30 days' free trial. You can use it to your heart's content, put a sharp edge on all your tools, and then, if you do not wish to keep it, return it at the end of 30 days.

No money required in advance.

LUTHER SHOP TOOL GRINDER

Dimo-Grit Wheels

¶ The wheels on this grinder are made of Dimo-Grit, the new artificial diamond sharpening substance that cuts steel as emery does copper—just a light touch needed—no water cooling—no danger of drawing temper. 25 times faster than the grindstone—10 times more efficient than emery.

¶ The Luther Grinder is equipped for **engine and foot power**—4000 revolutions a minute by foot power—shaft drive like automobile—built all of steel—dust-proof bearings—runs easy as sewing machine. *Tool rests and attachments enable anyone to do any hard grinding job as well as an expert.*

30 DAYS' FREE TRIAL

¶ Write at once for 40-page book which explains how to sharpen tools and tells all about the Luther Tool Grinder and the wonderful sharpening substance, Dimo-Grit.

Write now while you think of it

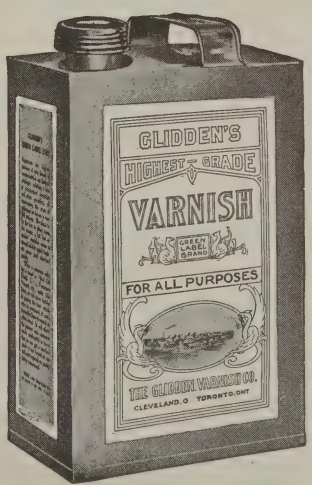
Luther Grinder Mfg. Co., 1219 Michigan St., Milwaukee, Wis.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Glidden

Green Label Varnishes

"Wear Well Long After Ordinary Varnishes Are Well Worn."



M. P. Durable Floor

is the most durable floor varnish on the market. This is due not only to the superior quality of gums and oils used in its manufacture, but also to a special process of blending and manipulating and to the fact that it is thoroughly aged.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Endurance Wood Stains

are rich in shade and pleasing in effect and will give satisfactory results.

In order that you may thoroughly appreciate them, let us send you our color card showing Glidden's Endurance Wood Stains in fourteen shades on the actual wood.

The Glidden Varnish Co.

Factories: Cleveland, Ohio — Toronto, Canada

Branches: New York Chicago London

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE LA PLANT HOUSE MOVING OUTFIT.

We have just received from the La Plant Tool Company, Marshalltown, Iowa, a photograph showing a house being moved by one of their outfits. Accompanying the photograph which is shown above was the following enthusiastic letter from the contractor who moved this building. It is hardly necessary to add that those who are contemplating work of this character should investigate the La Plant trucks and outfit before commencing their work.

Geneseo, Ill., Sept. 11, 1912.

La Plant Tool Company, Marshalltown, Iowa.

Gentlemen: Enclosed you will find a card of the house that I moved this summer. You will notice that the street is nearly all taken up by the house. It is about 30 feet wide and I never could have moved it on the old trucks that I have. You will also notice that we have just staked the capstan down and that the street was spongy and wet when we moved the house in May. It surprised the men to see me pull it up out of the cellar. With the old rig we always had to jack the building up level with the ground, but with the La Plant Trucks you can pull up any grade without any trouble.

If I had had a four-wheel rear truck I would have moved this house one-third easier, with less planking. It is no trouble to turn a building with La Plant Steel Trucks and your steel bolster is the finest thing that I ever saw.

I have had all the work this summer that I could do and have no trouble getting a good price for it. Since I have the rig I do not have to hunt for the work either.

Very truly yours,

ORRIN J. FISHER.

PLANS FOR CONCRETE HOUSES.

An architectural competition properly conducted brings out a great deal of original thought on the part of the draftsman. It is one of the best methods for obtaining the original ideas of the best thinkers.

Some time ago the Blaw Steel Centering Company offered prizes for the best plans and specifications for small, concrete residences, costing not to exceed $3,000. The idea being to provide a design suitable for any ordinary location, adaptable to any climate, and to have the walls made of poured concrete, reinforced if necessary. The balance of the design was left entirely to the judgment of the draftsman.

From a large number of plans submitted, Professor A. D. F. Hamlin, of Columbia University, selected the six best plans and awarded the prizes to them. These six, with a number of others of meritorious design, have been incorporated into a neat book. There is also included, suggestions for specifications for buildings with poured concrete walls in which the well-known Blaw Centering can be used. The book is practically an authoritative treat-

YOU SAVE THE EXPENSE AND BOTHER

of Painting, Papering or Decorating if You Use

Bird & Son's Wall Board

COMES to you as a finished product in an attractive reproduction of either plain or quartered oak. The batten strips of the same material make most attractive panels and relieve you of the necessity of purchasing wooden strips separately. Waterproofed on both sides to prevent warping and buckling, it is thoroughly practical. You can improve any house—new, old or in process of construction—by the use of this modern inside finish.

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EAST WALPOLE, MASS.
Established 1795
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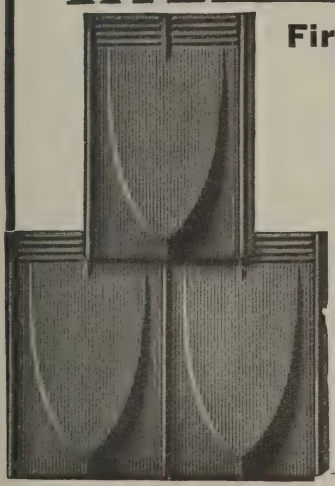
"TITELOCK" METAL SHINGLES

TRADE MARK

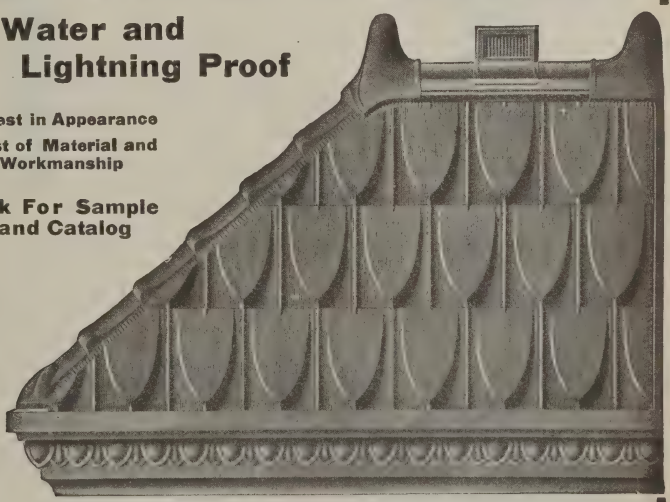
Fire, Water and Lightning Proof

Finest in Appearance
Best of Material and Workmanship

Ask For Sample and Catalog



STYLE B. Showing Method of Laying.



STYLE B. Showing Ridge and Hip Finish.

MILWAUKEE CORRUGATING CO.

Kansas City, Mo. Milwaukee, Wis.

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REMEMBER—Tomorrow's Success Depends Upon Today's Preparation

Prepare yourself and secure a

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The first element of success is **accuracy.**

Our instruments are all guaranteed accurate.

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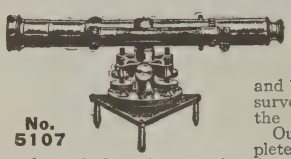
THE L. BECKMANN CO.
100 Adams St. TOLEDO, OHIO
Established 1874

Architects' and Builders' Levels



No. 5107

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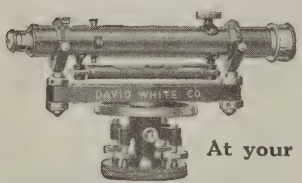

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Two Volumes. A practical treatise on the use of the Steel Square. By Fred T. Hodgson. 600 pages, 500 illustrations. The author was the first—really the only—to write on this important tool, and the two volumes contain the easiest as well as the latest method of using the **Steel Square** for the solution of the many problems in building construction. The two volumes are of the greatest value to the young carpenter. Single Volume, Part I, cloth....$1.00
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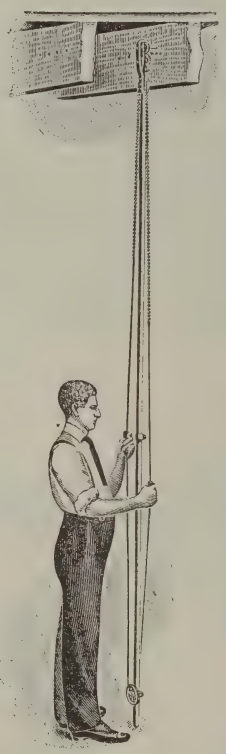
ise on this form of construction and will be of interest to the contractor erecting concrete houses, as well as the designer who is consulting his client's wishes.

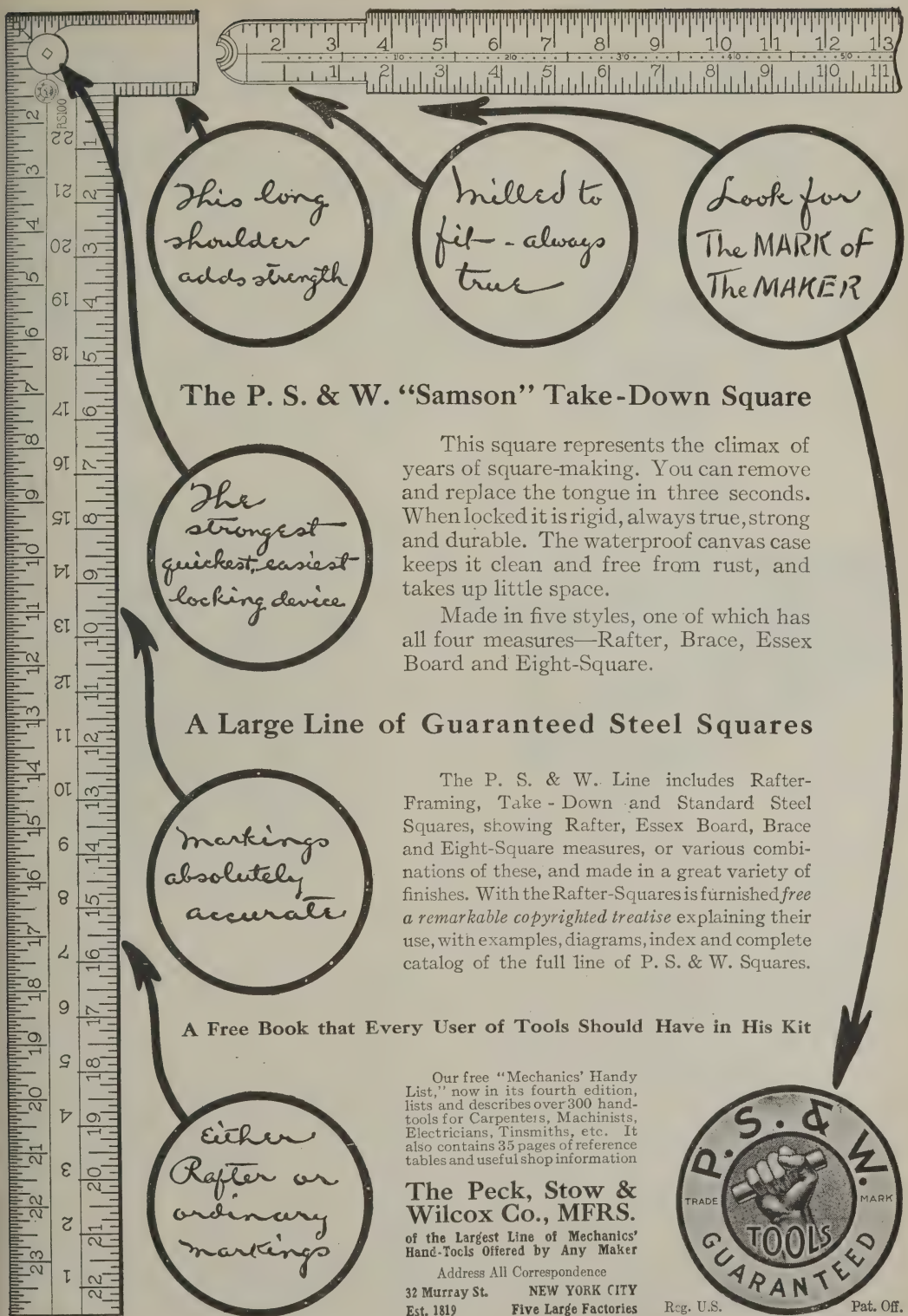
We understand that the Blaw Steel Construction Company, Westinghouse building, Pittsburgh, Pa., will send one of these books to such of our subscribers as write to them for it, provided the NATIONAL BUILDER is mentioned.

THE FORD BORING MACHINE.



The Ford Auger Bit Company of Holyoke, Mass., manufacture the Standard Boring Machine as illustrated herewith. This Machine is used for boring holes in high places as illustrated. Instead of a man spending his time running up and down a step-ladder with a bit and brace, he spends all his time boring holes. This machine can be used in very narrow places as it is less than three inches from front to rear and any length bit can be used. It is built on the most approved ideas in mechanical movements, and is guaranteed to work 25 per cent. easier than any other machine of this kind on the market. The machine has handles than can be adjusted to any position, and is operated by pulling down first with one handle, then with the other. When a Ford Bit is used it will bore itself through the wood, even through knots, and clear easily on coming out. With each machine two Ford Bits are given free, but the machine can be used with other styles of bits if desired. The sprokets and chains are of the well-known bicycle construction of high quality. The standard is made of two tempered steel tubes and can be quickly adjusted to any height. The internal ratchets are unique in their perfection. Interchangeable bronze bearings make the machine last a lifetime.

This company has a great many testimonials for this machine from carpenters and electricians all over the country. One man states he paid for the machine on the first job. Others claim that they can do easily three times as much work with this machine as with a bit and brace. The Ford Company gets out a booklet in regard to this machine which can be had upon request.


This long shoulder adds strength
Milled to fit—always true
Look for The MARK of The MAKER
The strongest—quickest, easiest—locking device
Markings absolutely accurate
Either Rafter or ordinary markings

The P. S. & W. "Samson" Take-Down Square

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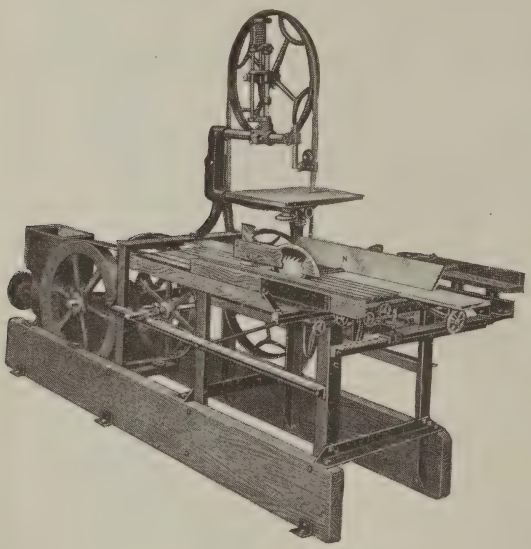
NAT. BUILDER

A PORTABLE OUTFIT.

We show on this page, one of the most compact and convenient portable woodworking outfits made. This is designed to be used in the shop or to be taken on to the job where it can be moved from place to place, or from floor to floor, as the work progresses. Provision is made for mounting the machine and motive power on the same base, thus facilitating the task of moving and providing perfect alignment of the shafting at all times. A combination of this character is of great value on even a small job. On this particular machine, three men can work at once at hand sawing, boring, or ripping or jointing. Each operation is on a permanent part of the machine so that



there is no time lost in bolting or unbolting the various parts with the consequent chance for breaking or misplacing them. The machine stands ready for instant use at all time.

Other useful attachments can be added if required, among them a swing cut off saw, which enables the operator to draw the saw across the material instead of handling heavy material across the table.

The machine is furnished with or without motive power, thus giving the customer the privilege of using steam, gasoline, or electric power as best suits his purpose.

The Parks Ball Bearing Machine Company, Knowlton and Fergus streets, Cincinnati, O., have a new circular of this machine which describes it in great detail, as well as their various other portable outfits. A postal will bring it.

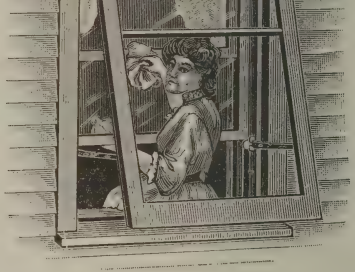
STORM SASH HANGERS.

At this season of the year, as preparations for winter are being made, carpenters are frequently called upon to equip new and old houses with storm sash. The value of double windows, particularly on the northern and western sides of a house is more and more appreciated; not only is a home more comfortable, but there is considerable economy in fuel, which offsets the expense of the storm sash.

Possibly the most important matter for the carpenter to consider in hanging the storm sash, is the hardware. The hooks or hangers should be strong, neat in design and handsomely finished. They should permit the storm sash to be quickly put up or taken down.

The windows should also be equipped with braces or fasteners to hold the sash in place, and it is a great advantage to have adjustable fasteners which will hold the sash firmly when partly open, in order to permit proper ventilation, and also provide for window cleaning.

"Peerless" Hangers and Fasteners, manufactured by the Stanley Works of New Britain, Conn., meet all of these requirements. They are made of the best quality of wrought steel,



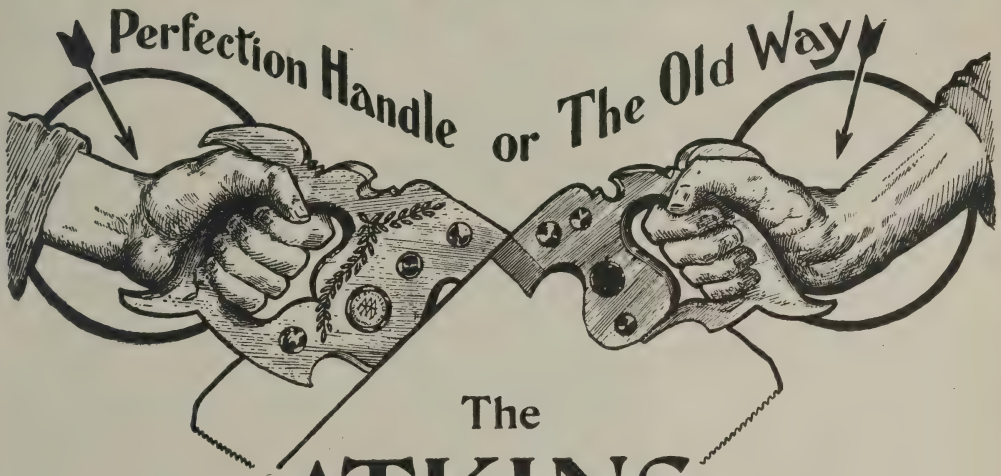
neatly finished in Japan. If preferred they can also be procured in the "Stanley" Sherardized finish, which is absolutely rustproof, and the ideal finish for hardware exposed to the weather.

When once hung on "Peerless" Hangers, storm sash can be taken down or put up very quickly and easily without using either ladder or tools. In the spring full length screens can be hung on the same hooks.

The "Peerless" Fasteners are strong but of a simple design and easily operated. They hold the sash securely either open or shut and prevent it from rattling or blowing off of the hooks.

"Peerless" Hangers and Fasteners can be purchased through all reliable hardware dealers. If more information is desired a card to the Stanley Works, New Britain, Conn., asking for Circular "N," will bring it by return mail.

Which wrist will do the most work?



The
ATKINS
Perfection Handle

TRY this for yourself. Run a straight line from your elbow, down thru your wrist and thru the saw blade. If it is a Perfection Handle you will find that the line comes out on the cutting edge—every ounce of pressure is directed at the proper point. If it's the old style handle you will find the line comes out on the top of the back of the saw. See the idea?

WE MAKE BOTH KINDS

If you still prefer the OLD STYLE HANDLE, then ask the clerk for ATKINS SILVER STEEL with old style handle. He will know—or you can easily see for yourself.

THE PERFECTION

But if you would prefer the latest pattern (exclusive with Atkins)—then ask for the Perfection Handle.

HOW MADE

Both have the same advantages as to scientific construction. Both are made of SILVER STEEL—both are taper ground. Manufactured in the largest exclusive saw factory in the world by the highest paid, most skilled mechanics.

OUR FREE OFFER

Send ten cents to pay postage and receive a package full of useful information about Saws and our free nail apron.

Ask your dealer for SILVER STEEL SAWS—he will get them for you if he does not carry them in stock. If he won't—let us know.

E. C. ATKINS & CO., Inc. **Indianapolis, Indiana.**

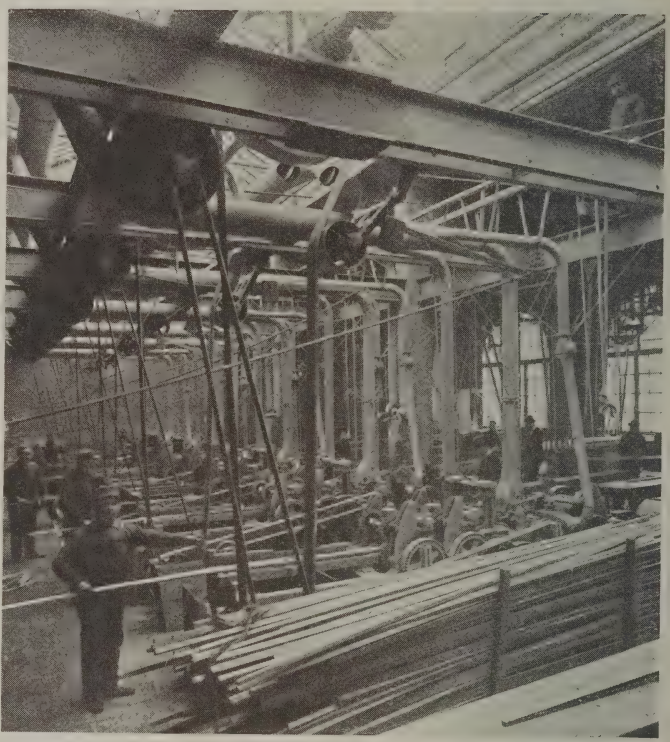
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

STEEL POLISHED PERFECTION FLOORING

While in the past a large part of the thought and skill of the manufacturer of hardwood trim has been given to the perfection of material for doors, casings, etc., it will be found that the manufacturers of flooring have likewise been perfecting their products and methods of manufacture.

Among those who have been foremost in bringing the various processes to the highest point of quality is the John Schroeder Lumber Company, Milwaukee, Wis. Under the name, "Steel Polished Perfection" they are making what they claim to be the finest hard wood flooring produced in America. This name does not apply alone to the actual surface finish, but to the entire process of manufacture, from the selection of the trees in the forest to the final delivery on the cars.

Naturally, material of this high character costs a little more than the ordinary and common grades generally found on the market, but there is the question of permanence to be considered as well as the temporary slight difference in price. The flooring lasts as long as the building and is subject to the greatest use as well as to the abuse from the constant travel over them in all sorts of weather.



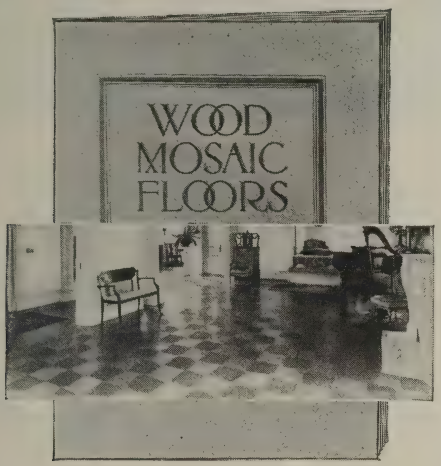
A Corner of the John Schroeder Lumber Co. Mill, Where "Steel Polisher Perfection Flooring" Is Made.

The short sighted buyer who considers first cost only, will probably see in a thousand feet of "Steel Polished Perfection" simply a thousand feet of machined lumber, costing possibly ten per cent more than the common grades he is accustomed to buying locally. The saving of ten to thirty dollars on the lumber bill for his house looks like great economy to him, but as a matter of fact, it usually means buying immediate trouble and permanent dissatisfaction; on the other hand, the man who appreciates the full truth of the old saying, "The best is always the cheapest," and who will not consider the few dollars difference in the first cost as being enough to keep him from getting the very highest quality of flooring—this man finds in "Steel Polished Perfection" hardwood flooring a never-ending source of pride and pleasure, as his house to the end of time reflects his good judgment.

There are several things to bear in mind when considering hardwood flooring. In the first place, ordinary flooring cannot be depended upon to fit perfectly. Although it is manufactured on machines supposed to produce pieces that will match exactly, it is seldom that even a fairly smooth floor can be laid with the ordinary flooring. This is because the manufacture of perfect fitting hardwood flooring demands a precision in machine adjustment and care on the part of the workman which is not necessary and consequently is not found in any other line of interior finish.

The manufacturers of the ordinary flooring have neither the time, facilities nor inclination to exercise this extreme care. The extra cost looks too big to them. Their main object is quantity and competitive prices rather than quality at a reasonable price, and so naturally the machines are run at their highest speed regardless of the condition of the knives and other adjustable and wearing parts. This is the reason why so much flooring can scarcely be driven into place with a sledge hammer or so fits loosely as to be valueless in matching. A floor laid of this material presents more or less of a wash-board appearance, and must be gone over with scrapers and surfacers to bring it to anything like a true surface.

When flooring is properly made, however,



NOT everyone can represent us. We are only as particular as we want you to be. If you work upon the theory that what you do today is an asset, digest this advertisement.

We sincerely believe the Wood-Mosaic Products the highest type of their kind possible to produce. We are not alone in this belief. Our ceaseless endeavor to attain and maintain such a position has not been without results.

Large businesses are almost invariably the outcome of an ideal—or condition. Our basic ideal has been that after all is said and done a room is made or marred by its floor. No other part is so conspicuous, so important, so dominating in its significance —or offers a greater field for study.

Every phase of the production of the Wood-Mosaic Products has been and is carried on with minute exactness. As one of hundreds of examples, we even accurately determine a wood's percentage of moisture before fully working it. This talk of ourselves is for a purpose. We would have you understand that with us the parquetry flooring business is a science. It is possible for you to turn this into profit.

Those who are not "mere dispensers" of "hardwood floors," draw upon us for their materials. They represnt the better parquet flooring companies doing the cream of the business in their respective centers. It's the cream that contains the profit—both present and future.

THIS trade-mark identifies the wood-mosaic products. There are reasons a plenty why you should be intimately associated with it. The qualification is that you abide by its principles.

There is ample territory where the products this trade-mark identifies should be more vigorously pushed. Parquetry flooring is sold in greater quantities today than ever before. No center is without its possibilities.

With all their quality and superior advantages the price of Wood-Mosaic Floors is not prohibitive. They cost more than a good carpet and are a hundred times more enduring. This is one of our most productive sales arguments. The average person admits a parquet floor's superiority, but comparatively few have any conception of its cost. The wealthy use them almost exclusively; surely they are a luxury! It should not be difficult for you to personally remove this impression—to substantiate the printed claims for the Wood-Mosaic Products.

We have recently issued a booklet so quickly, forcibly and comprehensively delineating the virtues of hardwood floors (Wood-Mosaic) that we call it a treatise on parquetry flooring. The public call it the most complete work of its kind ever published. We would like to send you a copy with our compliments. The outcome may be profitable and satisfactory to us both. We are desirous of locating a few more agencies. Let's discuss the proposition thoroughly and seriously.

Get the booklet first. You will know more about us and our products. What's your name and address?

WOOD-MOSAIC COMPANY

Largest Producers of Fine Parquetry Flooring

33 Hebard Street, Rochester, New York

Saw Mill and Flooring Factory:
New Albany, Indiana

Sales Office and Parquetry Factory:
Rochester, New York

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Gordon-Van Tine

In every state an army of carpenters and contractors are buying our millwork and builder's supplies. Over 100,000 houses in the United States and Canada are built with Gordon-Van Tine material because our plan permits builders to **save and make** big money.

Contractors! Get Our Direct Shipment Proposition

Our Direct-Shipment Proposition increases your profits on every job from **25 to 50 per cent.** Our facilities enable you to be your own dealer and pocket all dealers' profits. Cut out planing mills "rake-off." Our plans conserve your profits. Our staff of Architects and our Millwork Designers have for years worked together on the problem of producing unusual and beautiful architectural effects without leaving the contractor at the mercy of planing mills.

All odd sizes and special designs in sash, doors and millwork called for in our Certified Plans are made up by us in immense quantities and sold at extremely low prices.

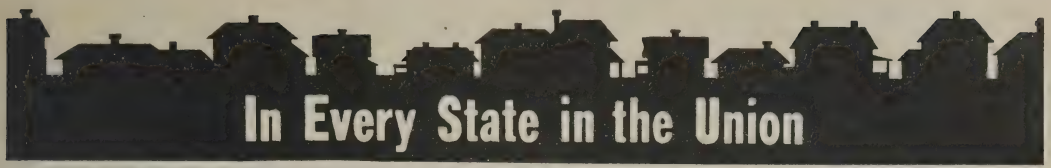
Local Competition Collapses Before Our Prices

Local mills cannot compete with our big plant.

To duplicate at the local planing mill the special and exclusive styles of millwork, etc., specified in a Gordon-Van Tine Certified Plan would increase the cost of the various items from 50 to 75 per cent.

No planing mill can compete with us on price.

NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Homes Are Everywhere!

Take stair work as an illustration.

A flight of stairs that has heretofore cost the carpenter or contractor from $75 to $90 can now be purchased from us, machine-finished, complete and ready to set up, for from $30 to $40. The same percentage of saving is offered on our entire line of building materials.

Our **certified plans** are the work of our own architects of wide experience, who devote their entire attention to designing high-class residences. They are specialists in this class of architecture, and over 100,000 splendid homes have been built from the plans. We know of no firm of architects who have had such experience and training.

Send Coupon For Plan Book and Building Material Catalog

Our 1912 Plan Book offers a magnificent collection of attractively designed houses, cottages and bungalows.

The only plan book extant that **conserves the profits of contractors** on homes in which special designs in sash, doors and millwork are so lavishly specified. Every plan a **Certified Plan.**

Ask for a copy of our latest Building Material Catalog, which saves an average of 50 per cent right straight through the list of 5,000 bargains. Put our Certified Plans and the resources of our great Building Material Plant to the test.

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629 Federal Street Davenport, Iowa

AMERICA'S LARGEST INDEPENDENT BUILDING MATERIAL CONCERN

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it matches easily and accurately, consequently it can be laid at a lower cost. The expert floor layer can lay good flooring extremely fast and the all-around mechanic finds a great advantage in properly made flooring. When once down, the floor is practically finished, as the hand scraping, surfacing and polishing is reduced to a minimum and in the case of "Steel Perfection" flooring, the precision in matching and exceptionally high finish given by the Schroeder machines make a flooring that is exceptionally smooth with a beautifully polished surface. In most cases, a Schroeder floor is practically ready for the wax or varnish as soon as the last nail is driven.

But there is more to the manufacture of flooring than the matching and surfacing. The lumber must be carefully selected and must be properly seasoned and dried. The slightest particle of moisture in the flooring when laid, spoils the surface. If the lumber is too wet, it shrinks and unsightly cracks open up, and if not properly seasoned, the floor will warp, twist and buckle. In such cases the best, quickest and cheapest remedy is to lay an entirely new floor. The Schroeder lumber is all carefully seasoned and freed from every particle of natural moisture by a process of their own, which includes double drying. After being piled at the mills, the flooring lumber is brought to the Milwaukee factory and here it is carefully piled with enough space left around every board to allow perfect circulation of the air, which dries or air-seasons the stock slowly and evenly. This required from six months to a year or more to insure the right degree of preliminary curing. In the warehouses are millions of feet of maple, beech, birch, oak, cherry and walnut lumber air-drying the whole year round. In the average mill this seasoning is entirely eliminated, the manufacturer contenting himself with sliding the material into an over-heated dry kiln at the earliest opportunity and quickly baking out whatever life there is left in the wood. Kiln drying is necessary after this air curing, but it must be done at a comparatively low temperature in order not to burn the wood. Of course, this requires more kiln room and a longer time in the kiln, but the Schroeder plant is provided with modern facilities for just this contingency. A feature of their drying is that the wood is first subjected to dry steam under pressure, which opens up the pores of the wood and allows it to dry evenly and perfectly, through and through.

The John Schroeder Lumber Company make a specialty of flooring, and consider themselves an authority on the subject. Their latest catalogue and price-list shows a great variety of the different woods, sizes, etc., which they manufacture; the different woods being reproduced in their natural colors. The catalogue also contains valuable rules for laying hardwood flooring, and for measuring and grading which are of interest and value to the contractor, carpenter and builder. This catalogue should be in the hands of every one interested in a perfect floor.

RED CEDAR SHINGLES.

The rapid growth of the bungalow idea has led the Red Cedar Shingle Manufacturers' Association, 497 Arcade Annex, Seattle, Wash., to issue a neat booklet showing a number of designs for bungalows, exteriors, floor plans, etc., in this interesting style of American architecture.

These plans have been prepared by the best architects throughout the country, and reflect the architect's skill in the fact that red cedar shingles were used in their construction, in some cases for the roof only and in others for the sides as well. We understand that the Red Cedar Shingle Manufacturers' Association will be glad to send this book to our readers on request.

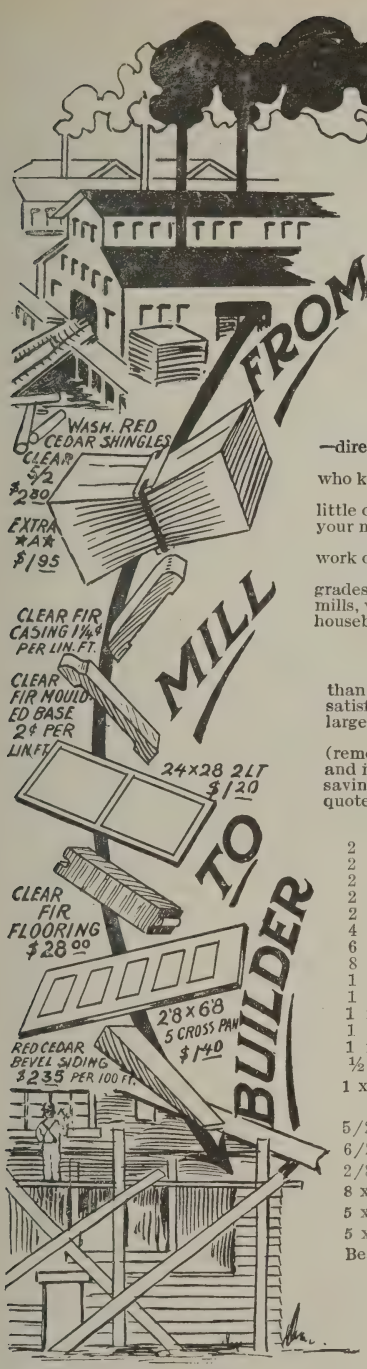
BETTER MILL WORK.

Catalogue No. 32, showing the complete line of mill work and hardware handled by the Chicago & Riverdale Lumber Company, 13537 Indiana avenue, Riverdale, Ill., shows a number of specialties which this progressive Company is placing on the market, and indicates that quality and low prices can be combined by the progressive manufacturer. The contractor who sends a list of the materials which he requires, or the plans and specifications for a specific job, will be sure to get an estimate on the best grade of materials at the lowest price consistent with quality.

As the Chicago & Riverdale Lumber Company have their own plants, they can insist upon only first-class work being turned out, and they can assure their customers that the materials will be shipped as and when ordered.

SMITH'S HAND MIXER.

There are two ways of handling small concrete jobs, such as sidewalks, culverts, light foundations, etc. The old way has been to job around and find a contractor who makes a specialty of that class of work and turn it over to him with the result that there is another gang of men on an already crowded job mussing around in the way of everybody else; or perhaps the contractor will decide to mix the concrete by hand and engages a bunch of men who are not accustomed to working in concrete and are not accustomed to working to-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TO
BUILDER
WASH. RED CEDAR SHINGLES CLEAR 5/2 $2.80
EXTRA *A* $1.95
CLEAR FIR CASING 1¼¢ PER LIN. FT.
CLEAR FIR MOULDED BASE 2¢ PER LIN. FT.
24x28 2 LT $1.20
CLEAR FIR FLOORING $28.00
2'8"x6'8" 5 CROSS PAN $1.40
RED CEDAR BEVEL SIDING $2.35 PER 100 FT.

We'll Help You Figure a Profit

The first step in making building profitable is to buy your material **right.** We'll help you at the start by selling you

Lumber and Millwork Direct

—**direct** from first hands, direct from our own mills.

It's no trick to buy material, but it's the successful builder—the money-maker, who knows **where** to buy the **finest** qualities at the **lowest possible prices.**

Labor in your city costs the same for your competitor as for yourself; there's little chance for advantage there. Your **surest** point of advantage then is in buying your material in the right market.

Get the dollars you may be losing—get them by buying your lumber and millwork over the heads of **all** middlemen, direct from the manufacturer.

We own the timber, log it, haul it, and cut it in our own mills into the finest grades of lumber and with the seven transcontinental railroads available at our mills, we ship it **direct to builders everywhere,** saving you **40%** to **60%** on a housebill.

HERE'S OUR GUARANTEE ON LUMBER

We manufacture all our own lumber and guarantee you better grades than you can get from a local dealer—this is an unconditional guarantee of satisfaction or your money back. Prompt shipments are assured you from our large mill stocks; absolutely no delay.

You'll find it profitable to study the money-saving prices quoted below (remember that we absolutely guarantee the finest quality), then clip the coupon and mail it to us today. You'll find proof of our statements in our big, money-saving price list. Or, better still, send us your housebills for estimate; we'll quote you a price delivered to your station. Note these mill prices.

F. O. B. MILL, Seattle, Wash.

2 x 4—12, 14, 16 ft.	No. 1 Common fir sized	$12.00 per M.
2 x 6—12, 14, 16 ft.	ditto	11.50 " "
2 x 8—12, 14, 16 ft.	"	11.50 " "
2 x10—12, 14, 16 ft.	"	12.50 " "
2 x12—12, 14, 16 ft.	"	13.00 " "
4 x 6—12, 14, 16 ft.	No. 1 Common fir S4S	13.00 " "
6 x 6—12, 14, 16 ft.	ditto	14.00 " "
8 x 8—12, 14, 16 ft.	"	14.00 " "
1 x 6—No. 1 Common fir fencing S1S		12.00 " "
1 x 8—No. 1 Common fir boards S1S		13.50 " "
1 x12—Select No. 1 Common barn boards S1S		15.00 " "
1 x 4—1st Clear SLASH grain fir flg		17.00 " "
1 x 4—1st Clear EDGE grain fir flg		28.00 " "
½x 6—"A" clear red cedar bevel siding		21.50 " "
1 x 6—No. 2 Clear & Better Clear fir drop Siding (best grade)		19.00 " "
5/2—Clear red cedar shingles		2.40 " "
6/2—Extra *A* red cedar shingles		2.90 " "
2/8x6/8—1⅜ 5 x panel 1st quality fir door		1.80
8 x 8 x 8—Clear fir colonial stave column		1.54
5 x 5 x 8—Clear fir solid turned column		.60
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Beautiful front doors 2/8x6/8—1⅜—1 lt. 1 panel		4.00

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NAT BUILDER

gether. Both these results are unsatisfactory, in price, time, materials and results.

The better way for the small contractor to do this class of work is to use a small mixer something on the order of the Smith Hand Mixer, as shown in the accompanying cut. While this machine is small, it will turn out several cubic feet of mixed concrete in a batch and will do it rapidly enough to turn out thirty to thirty-five cubic yards of first-class, well mixed concrete per day.

This outfit is light and compact and can be moved as the work progresses, after every batch if necessary. The fact that it is operated by hand obviates the necessity for a gasoline engine being run more or less constantly, which usually requires more skilled labor and expense in its operation.

The circulars of this mixture, which the T. L. Smith Company, 1336 Majestic building, Milwaukee, Wis., are sending out to interested contractors shows in detail the operation of the mixer and gives the reason why a perfect mix is obtained with little labor. Incidentally the Smith Company manufacture larger machines for every purpose and their catalogues can be obtained upon request.

PERGOLA CONSTRUCTION.

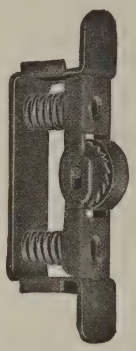
However beautiful may be the design of a pergola, its value is limited unless of a construction which insures protection against the weather. The slightest crack or opening means the entrance of moisture to the interior of the columns, with the consequent swelling, warping and rotting.

The methods followed by the American Column Company, Battle Creek, Mich., in the manufacture of their stay-locked columns, is

such that there is no chance for moisture to get to the inside of the column and the permanence of the column is thereby insured.

The fact that the American Column Company has furnished a great many columns for pergolas, porches, pilasters, and other exterior work would indicate that they are in a position to turn out this class of work with speed and accuracy. Their latest catalogue shows a number of the beautiful residences on which their columns have been used and gives to the contractor an idea of the value of work of this character when properly made and built in place. We understand that this catalogue will be sent to our readers on request.

AUTOMATIC SASH HOLDERS.



The use of double hung sash, blinds, etc., necessitates the use of some form of balance to hold the sash at any desired point. While for many years a balancing weight, working over a pulley, has been used with more or less satisfaction, the disadvantages, which come from breaking cords, pulleys, etc., have led many designers to consider the question of a more dependable construction.

One of the solutions is the automatic sash holder, a cut of which is shown on this page. As it will be seen, it is a small device readily fitting into the sash and thereby saving the cost of pulleys, weights, cords, etc., as well as simplifying the construction of the frame, no box, pockets, or grooves being necessary. There is the added advantage that these holders are adjustable so that it is not necessary to carry a large number of different sizes for each different weight of sash, as is necessary with weights, as the holder operates by friction, it also prevents the windows from rattling. The automatic sash holder is invisible, being inserted in the sash or stile, and can be easily adjusted to any window, new or old.

The Automatic Sash Holder Mfg. Co., 48 Church street, New York, have circulars of this useful device, which they will be glad to send to carpenters, contractors and builders. The circulars will convince one that they are a good thing and will unquestionably result in a trial order.

A BIRCH BOOK.

Birch is one of the native woods of America which is particularly adaptable for use as trim in our American homes. The fact that it is widely distributed over the northern states makes it available in practically all districts. The peculiar characteristics of Birch renders it available where many other woods, affected by the moisture and other climatic conditions would not be satisfactory. Carpenters and builders are generally familiar with the working qualities of Birch and can handle it to advantage.

The Northern Hemlock & Hardwood Manufacturers' Association, Wausau, Wis., control vast forests of Birch timber heretofore inaccessible by water or rail and are now opening up these forests to supply material for their mills. This insures the highest quality of material for many years to come, as with the reforestration principles which this association uses, the supply of first-class material will be practically inexhaustible. The association is issuing a book on Birch, the publication "D," which explains in great detail their facilities and the good qualities of this material.

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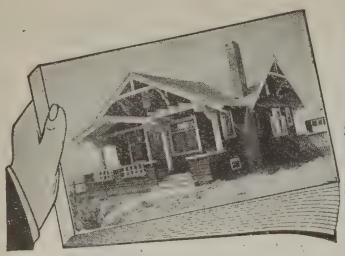

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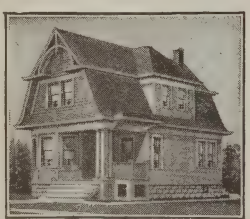

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ARCHITECTURAL TERRA COTTA.

No material has the qualities for ornamentation that are possessed by terra cotta. This is due, first to the fact that it can be easily molded to any desired shape and retains its color, while its durability puts it in the forefront of all the structural materials. Pieces of it, which were used on buildings thousands of years ago are still in perfect structural condition, although the stone walls which carry it have fallen into ruins. In modern times, we see many examples of buildings in which the terra cotta is practically the only material remaining uninjured after a conflagration. The recent fires in Baltimore, San Francisco, and other places demonstrated the fact that terra cotta is indestructible by this element which destroys all others.

Terra cotta is primarily divided into two kinds, structural and architectural. These two classes vary widely in their appearance, the former being made as rough and porous as possible that the mortar may better adhere to it, while the latter is made as dense and smooth as can be, to provide an artistic and permanent exterior. In the manufacture of terra cotta, the various colors and textures can be combined and form an integral part of the material, being burned into it at a temperature far in excess of what would be met with in any ordinary conflagration.

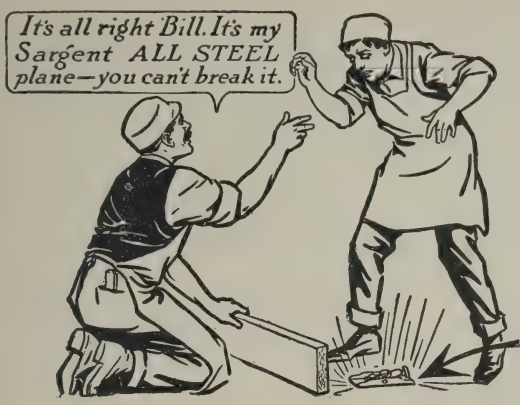
As a material to express taste or individuality, terra cotta has no superior. The ideas of the architects can be correctly expressed and each building can be given a prominence by a careful combination of design and color scheme.

Terra cotta is practically indestructible by fire, water or frost, and in consequence, is especially desirable for use in exterior facings of fireproof buildings where ornamentation is desired.

The Northwestern Terra Cotta Company, 2525 Clybourn avenue, Chicago, have supplied the terra cotta facings for many of the prominent buildings throughout the country. In their large plant are found all the machines and equipment necessary to turn out the highest grade of work in the shortest possible time. The frequent additions to their plant have brought it to a state of completeness rarely found in plants of this character. From the drafting room, where the architects' designs are worked up into drawings for the modeling room, to the shipping room, every effort is made to produce only the highest grade of material.

In the manufacture of terra cotta there are many problems of which the ordinary mechanic knows very little. The completed piece fits so readily into place that it is hard to realize the difficulties under which the workmen have prepared it. Large surfaces, when burned, have a tendency to warp, twist, and shrink, and this must be carefully guarded against. Even with the smaller pieces, a slight variation in temperature causes destruction.

Terra cotta is not imitation stone and should



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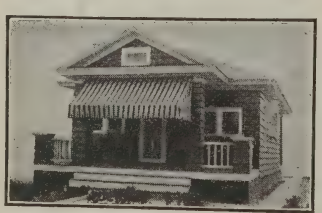

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not be treated as such. Its distinctive peculiarities should be carefully considered and its individual characteristics must be expressed, and not be treated as if the material was merely a form of stone.

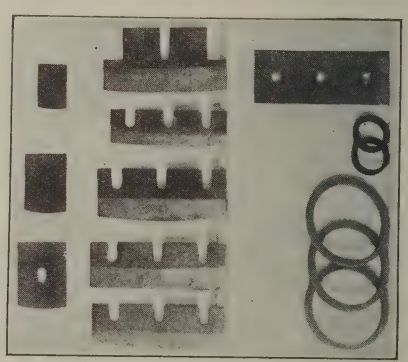
In comparing the cost of terra cotta with other forms of ornamental material, terra cotta has a great advantage, especially if the ornamentation is repeated, as the same mold can be used for consecutive modelings. When properly made, the lightness of terra cotta permits its use in many places where stone or other materials could not be used on account of their weight.

One of the latest forms of terra cotta has the surface enameled so that the surface is absolutely impervious to moisture and can be washed when desired. This makes it especially desirable for lining interior courts, air shafts, etc., where every advantage must be taken to save what daylight enters and where smoke and soot soon darkens the surface.

The Northwestern Terra Cotta Co. are prepared to show contractors and builders the advantages of using terra cotta on even the smallest buildings, and the facilities of their entire plant are at the disposal of our readers. Their recent literature showing the various colors and finishes in which they are prepared to make terra cotta should be in the hands of every contractor and builder. We understand that it will be sent free, provided the NATIONAL BUILDER is mentioned.

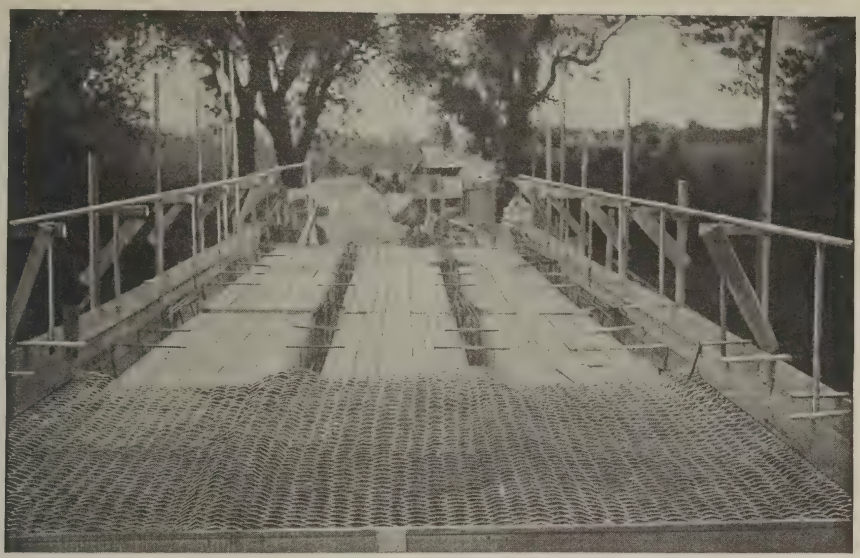
FLOOR SCRAPING KNIVES.

The use of floor scraping machines requires not only a machine which is mechanically perfect to do the work, but it also means the use of knives particularly adapted to the purpose. Unless they are of the right grade of steel, the proper temper, size, shape and thickness, the



work of the scraper is greatly hampered and an imperfect job is the result.

The Fox Supply Co., Brooklyn, Wis., have made a specialty of the knife problem and have developed this branch of the work to a high point of efficiency. So well known are their knives, that other manufacturers are asking them to make and temper knives for their ma-



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THE PEARSON AUTOMATIC SHINGLE NAILER.

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It is indeed a never-failer,
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So simple is its plan,
It sets the nails to drive much faster
Than several shinglers can.

The Shingle Nailer automatic,
That has so famous grown,
It never is a thing erratic,
And not a hitch is shown.

Of all slick tools it is the slickest,
It's little and most light,
Of all things quick it is the quickest,
And sets the nail just right.

It takes the labor out of shingling:
It makes it real fun,
No fingers are with frost a-tingling—
You'll work with mittens on.

A nail for you stands ever ready,
You quickly drive it home,
For its delivery's always steady,
And very fast they come.

Through tin or sheet iron nails are driven,
Howe'er the pitch may stand,
And then it sets them nice and even,
And seems like sleight of hand.

Carpenters who have never tried the Pearson mailer will wonder how the simple machine inspires one to write like this. They should examine a mailer at the nearest hardware store or write to the Pearson Manufacturing Company, Robbinsdale, Minn., for information.

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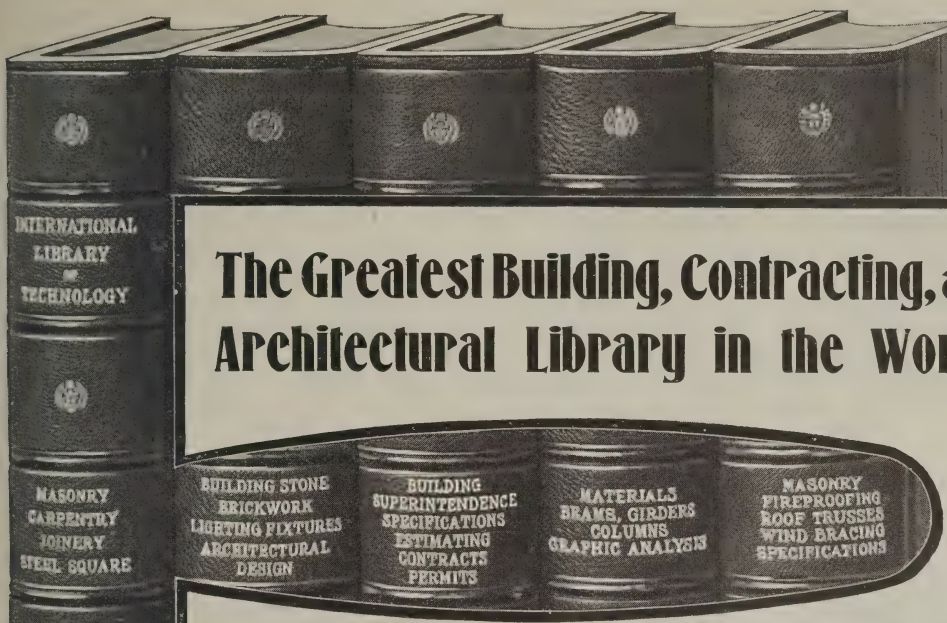

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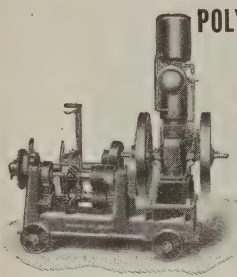

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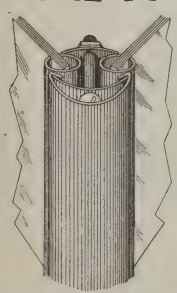

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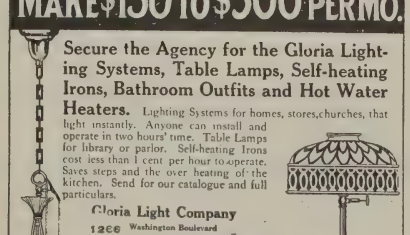

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The H. W. Johns-Manville Company announce that after considerable experimenting they are prepared to offer a new form of J-M Transite Asbestos Shingles, designed to fully meet the idea of architects as to a more artistic asbestos shingle.

These new Asbestos Shingles will be a full quarter inch thick, and instead of the edges being smooth and uniform, they will be finished slightly irregular or rough.

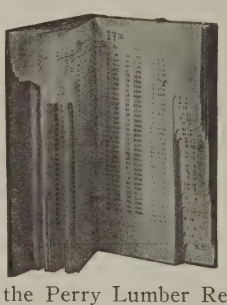
This extra thickness and rough finish will not only enable the builders of high-class residential and business structures to secure a more artistic roofing, but one that is also more durable and fire-proof.

Other advantages claimed for Asbestos Shingles are that they are weather-resisting; weigh less than slate or tile and consequently do not require such heavy roofing timbers; are not fragile like slate or tile; do not split, crack, or exfoliate when exposed continuously to extremes of weather; will not rot, corrode or decay, and do not require painting or any other up-keep expense.

The manufacturers offer these new shingles in such standard colors as Indian Red, Slate and Natural Gray, in sizes 9x18 inches for the American method of laying, and 18x18 inches for French or diagonal laying.

First Course, "Starters," Hip and Ridge Roll Sections have also been designed to match in both thickness and color.

THE PERRY LUMBER RECKONER.



The contractor on ordering a bill of lumber naturally wants to know how much it is going to cost him, how many feet there will be, and possibly some other data in connection with it. All this takes time to figure out and entails the possibility of many mistakes. To assist the carpenter or contractor in this work, the Perry Lumber Reckoner was designed. This handy little volume gives the number of board feet in any number from one to a hundred pieces for practically every size stick which the contractor can possibly have in mind. Everything under twelve by fourteen are carefully figured.

The Reckoner has a most unique cut index by which any size piece and the required number can be instantly found, and also contanis a great deal of useful estimating data, such as tables showing the number of feet, board measure, per lineal foot; the number of pieces required for a thousand feet; surface measure tables, etc.

The Perry Lumber Reckoner is sold by Benjamin L. Jinks, 906 Williamson Bldg., Cleveland, Ohio, at the price of $1.00. It will save its cost on the first job on which it is used in ordering and checking up the material, and it should be the pocket companion of every carpenter, contractor and builder.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Be Progressive

Retain the old that is *good*—adopt the new which is *better.*

OUR ROOFING TIN

is coated in the good old way, because no better way has been found.

Our Copper Bearing Open Hearth Steel Base is the result of modern scientific research.

This combination makes the BEST ROOFING OBTAINABLE. A test will readily determine its superiority. Give it a trial.

Write for full information on our high grade Terne Plates, Apollo Best Bloom Galvanized Sheets, Black Sheets, Formed Roofing and Siding Products, Metal Lath, etc. Send for Weight Cards and New Pocket Reference Book.

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Made up to your exact specification as to size, thickness, kind of wood required.

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add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.

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The lately patented springs and corrugated steel rods put the "Phoenix" far in lead of less improved styles.

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THIS COLONNADE
Only $13.75
In Yellow Pine
Oak or Birch $14.50
Any size up to 8x8. Columns 6 inch diameter tapering to receive 5in compo. cap. Casings & cap trim not included.

THIS is positively the best Colonnade for the price in the market today. Take advantage of this special offer. Quality, satisfaction and safe delivery guaranteed. Order today. Give exact width and height of opening. State what kind of wood.

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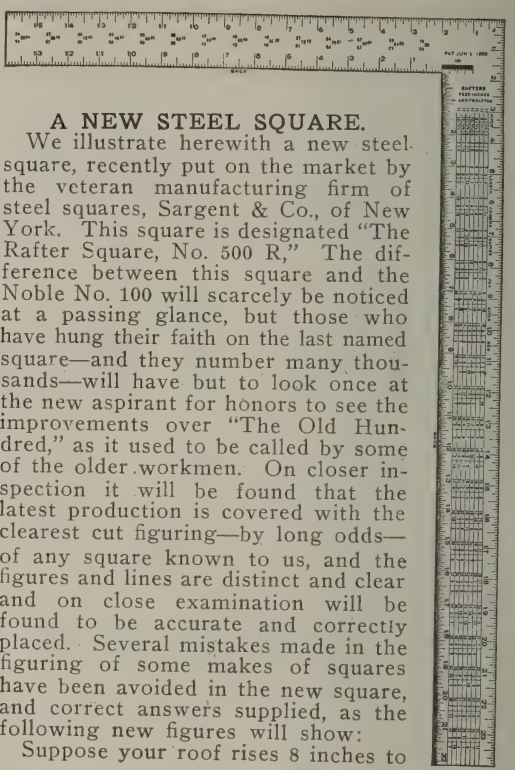

A NEW STEEL SQUARE.

We illustrate herewith a new steel square, recently put on the market by the veteran manufacturing firm of steel squares, Sargent & Co., of New York. This square is designated "The Rafter Square, No. 500 R," The difference between this square and the Noble No. 100 will scarcely be noticed at a passing glance, but those who have hung their faith on the last named square—and they number many thousands—will have but to look once at the new aspirant for honors to see the improvements over "The Old Hundred," as it used to be called by some of the older workmen. On closer inspection it will be found that the latest production is covered with the clearest cut figuring—by long odds—of any square known to us, and the figures and lines are distinct and clear and on close examination will be found to be accurate and correctly placed. Several mistakes made in the figuring of some makes of squares have been avoided in the new square, and correct answers supplied, as the following new figures will show:

Suppose your roof rises 8 inches to the foot, it is then called a ⅓ pitch (in other words, the rise would be ⅓ the width of the building). If the building is 16 feet wide, half the width would be the run of common rafters or 8 feet.

Common Rafters.

As used in some framing squares under 8 on the first line are the figures 14.42, which is the length of common rafter for one-foot run. Multiply 14.42 by 8 and you get 115.36. You have 115.36 inches or 9 ft. 7⅜ in.—Answer.

As used on the Rafter No. 500 R. Square under 8 on the third line (third because opposite ⅓ pitch), is 9 ft. 7 5-12 inches.—Answer.

Now making use of the hip rafter methods, we have on some squares, the following: On the second line under 8 are the figures 18.78. Multiply these figures by 8, which is the run of the common rafter and you get 18.788 in., 150.24 or 12 ft. 6¼ in.—Answer.

Sargents Rafter No. 500 R. On the third line under 8 (the run of common rafter) is 12 ft. 6-2/12 in.—Answer.

Again, in the instance used you will note in some squares that they make

Be the Man Who GIVES Orders

Don't forever be at the beck and call of some petty, tyrannical "boss." Your "boss" of this year may be your subordinate of next if you make the effort to better your position. We offer you an opportunity to become **the man who gives orders.** To carpenters, bricklayers, and all men in building trades, we offer a short but complete course in DRAFTING,

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You know the advantages of being able to read plans and to estimate, and the opportunities for promotion and prosperity that come to those with that ability. Hundreds of plans of buildings, in course of construction in Chicago, are studied from. The lessons are approved by experienced Chicago architects. We have partial courses to fit your individual need, if you have had previous experience. Start now on your journey to success. Don't say you can't do it—you can; don't say you haven't the time – take it; don't say you haven't the money—earn it as you study. Determine now whether you will advance in salary and position or let other men go ahead of you. Send for Free folder, NOW.

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Short resident courses in our Chicago school in Architectural, Mechanical and Structural Drafting. Low tuition. Day and evening classes. Ask for catalog Y if interested in the resident course.

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Mr. Contractor, Are You Satisfied

that you are getting the best quality and service in Millwork and lumber that your money will buy? If not, let us prove to you that our "BETTER MILLWORK" and lumber is right in quality and manufacture, and that it will make you a **15 to 25% saving on every job.**

Write us now—we figure Millwork from plans

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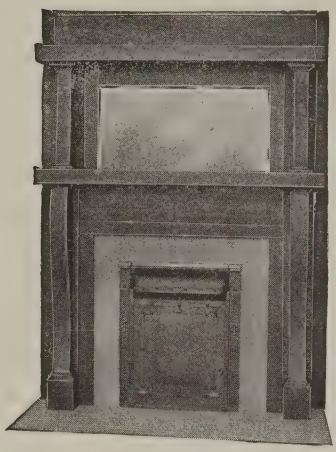
$28.60

For this Elegant, Massive Selected Oak or Birch

Mahogany Finished Mantel

Beveled Mirror, 18x36 inches



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CENTRAL MANTELS

are distinctive in workmanship, finish and style. Twenty-five years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

CATALOGUE FREE. Will send our new 100-page catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

Central Mantel Company

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Let's get together now—We know we can please you.

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MR. CARPENTER AND BUILDER! WHY NOT MAKE some extra money?

by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **Rolling Ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary te send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

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Milbradt Manufacturing Company
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use of the figures 14.42. These should be 14.42222, which are correct, whereas others approximate. Also in the hip rafter instance, others use 18.78 instead of 18.761, etc., and in the second answer Sargent has 12 feet 6 1-6 inches (which is, if anything, a little over the exact answer), others have 12 feet 6¼ inches.

Improvements are gradually being made in steel squares, and this latest development on this line seems much in advance of anything yet produced, and it is due to the enterprising firm of Sargent & Co. that they get credit for many of the improvements that have helped to make this tool the helpful instrument it has become to the working man. Some day a clever young fellow will rise up from his bed with a steel square imprinted on his mind, having a rule joint on the angle that will admit of the tongue and blade being folded. Then will we have a perfect steel square that will surely be made by Sargent and Co., ere many moons have waxed and waned.

TECHNICAL EDUCATION.

Modern construction has progressed by leaps and bounds since the first steel structure, or skyscraper was erected. Several men now living claim to have been interested in designing the first structure of this character and the buildings which they erected are still in use and in an excellent state of repair.

The modern skyscraper, as it is called, requires the services of a competent designer. Not alone must he have the architectural taste to cover the skeleton with a pleasing exterior, but he must be prepared to design the steel structure which carries the entire building.

The Chicago Technical College, 655 Athaeneum Bldg., Chicago, Ill., has for several years conducted classes in structural designing, with the intention of training the students in the best forms of modern construction. That their theories and courses are right is evidenced by the fact that a number of buildings have recently been erected directly from the plans of the students. The student is also given a complete course in theoretical design, which aids him in the practical work in the drafting room.

The course of instruction provides for both resident and non-resident students. Where one can attend every day the completion of the course requires very much less time and one has the advantage of intimate association with the instructors, thus quickly solving whatever problems may arise. For those who are not so fortunately situated, however, the correspondence course provides an excellent substitute; the main difference being in the length of time necessary to complete the work. Midway between these two, might possibly be termed the evening classes, where the student, obliged to work during the day, can only spend a few hours in the evening to improve his education.

The student is in all cases given individual instruction so that he progresses as fast as his individual ability will permit. The recent cir-

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Mantels and Fireplaces to Suit any Need or Taste

Whatever the style of decorations in the house to be built or remodeled—

Whatever the size of mantel required, or whatever the wood and finish desired—

You can get the kind of mantel you have in mind from us. Our styles are all unique, handsome, rich in artistic value, or attractive in simplicity.

Our line of Colonial, Mission and Standard Mantels is the most complete in the country, and all goods are guaranteed as to quality.

You will be interested in our large new catalog, showing also brick mantels and a large selection of fireplace fixtures, consoles, colonnades, etc.

Write for a copy. It's sent on request.

Chas. F. Lorenzen & Co.

703-709 N. Sangamon Street CHICAGO, ILL.

You Should Have This Book

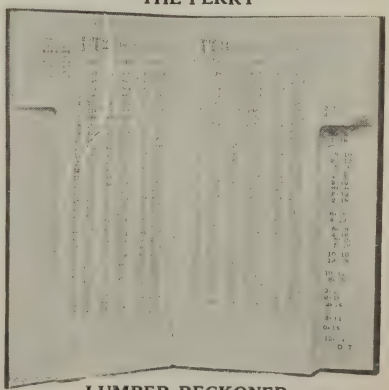
No man can carry in his head the number of feet in any number of pieces of all the different sizes of lumber, and therefore mistakes in figuring lumber are bound to occur more or less frequently.

One such mistake will mean a loss of many times the cost of the Perry Lumber Reckoner. With the Reckoner such mistakes are eliminated.

The Perry Lumber Reckoner is a carefully prepared pocket edition of tables of lumber showing the number of feet in any number of pieces of a given size, so indexed that you can turn instantly to the right page.

One dollar is mighty cheap insurance against loss by faulty lumber estimating, yet if you'll fill in, cut out, and send us the coupon below together with $1.00, the book will be sent you prepaid. And we cheerfully refund your money if this book is not entirely satisfactory. Thousands of them are used by lumbermen. YOU can't afford not to use one.

THE PERRY



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Enclosed find one dollar ($1.00) for which kindly send me prepaid, a copy of "The Perry Lumber Reckoner."

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Workers in Art Glass and Mosaics. Catalogue Free.

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Prevents Slivers and Pieces of Material from flying back and injuring the operator.

Absolutely the best Saw Guard made, and sold at the lowest price.

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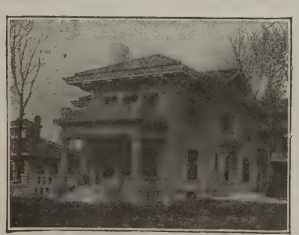

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Before you build or repair the old home have your architect write us for book telling of "Stonekote" Portland Exterior. What color would you like a sample to be; Gray, Silver Gray, White, Buff, Red, Brown?

THE GARDEN CITY SAND COMPANY
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709-11 Chamber of Commerce CHICAGO, ILL.

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culars of the Chicago Technical College outline the courses of study and the subjects taught and is an excellent guide to one considering taking up this most interesting and remunerative profession.

THE KEYSTONE FOLDING SAW CLAMP.

Every carpenter recognizes the necessity of keeping his tools in perfect condition. No one of his tools is subjected to harder usage than his saw and to keep it in shape requires frequent filing and setting.

To hold his saw in position the jack-knife carpenter builds up a wondrous construction of two by fours and boards and wedges, usually at the expense of his employer, his time to do this amounting to far more than the cost of a first-class saw clamp.

The up-to-date carpenter carries in his kit a folding saw clamp, which is readily attached to a bench or scaffold and is thus enabled to file and set his saws without loss of time or labor.

The Keystone Folding Saw Clamp embodies a number of advantages over many other forms of clamps. The cut herewith shows the

clamp folded for the tool box, indicating its small volume and weight. The jaws are fourteen inches long, so that but one shift is required for the ordinary saw.

Among the advantages claimed for this clamp are the jaws drop to position by their own weight, allowing the free use of both hands for adjusting the saw.

An eccentric lever automatically centers the jaws opposite each other with one closing motion, giving the tightest possible grip, yet working quickly and with slight effort.

Roller bearings are provided which reduce the friction and wear to a minimum. The faces of the jaws are covered with felt, which deadens the noise of filing, decreases any possible vibration and protects the saw from marking or scratching. The fine finish put upon the best saws is thus maintained throughout the entire life of the saw.

The clamp weighs but three pounds and is made of malleable iron, with a warrantee against breakage. It folds up like a jack-knife and can easily be carried in the pocket, occupying no more space than the ordinary hammer.

Further particulars and descriptions of the clamp can be obtained from the Jos. Woodwell Company, 201-203 Wood street, Pittsburgh, Pa., who also manufacture a number of labor-saving devices for the busy carpenter and contractor.

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If you are, let us direct your attention to the beautiful town of

COLLINGWOOD

Ontario, Canada

This is a desirable place for any man having some capital and a good business capacity. Fortunes lie waiting in this town for men who are desirous and willing to go into some manufacturing business enterprise. There is no town on the great lakes that offers the same favorable possibilities for the transportation and economic manufacture of goods, as does Collingwood, as the town is situated at the very gateway of Georgian Bay on Lake Huron, with steamboat and railway communication with the great and rapidly filling up Northwest territory, which includes the largest wheat growing area in the world. Hundreds of thousands of people are rushing into this area each year, and new villages, towns and cities are springing up every day, while railways are "girding" the country from east to west as rapidly as over 100,000 men can get them down. Thousands of miles of new tracks are being put into service yearly. The new emigrants settling in the country are made up chiefly of people from the British Islands, Americans, a few Germans and French, with a slight sprinkling from other countries. All have money to spend, and the English and Americans spend freely, and, as the whole country is prosperous and money making, there is no danger of the source giving out. It is estimated that over 200 million bushels of hard wheat will be exported this year from the three provinces of Alberta, Saskatchawan and Manitoba, without including the products of fish, minerals, fruit, grain and other things which are the products of the great provinces of British Columbia, Ontario, Quebec and the Maritime Provinces.

Collingwood is prepared to encourage and deal liberally with individuals, firms or corporations who may contemplate starting up or establishing any sort of an industry within her limits.

For information and further particulars, address

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Asbestos "Century" Shingles

"The Roof that Outlives the Building"

Every time a roof breaks down, it is asked of architects, builders, roofers, "What roof do you recommend?" You will find it worth while in all ways to get the facts about Asbestos "Century" Shingles and pass them along to your clients.

Made of cement reinforced with asbestos. Fire-proof, weather-proof, time-proof. Light-weight. **Permanent**—need no painting or repairs.

Numerous shapes and sizes. Four colors—Newport Gray (silver gray), Slate (blue black), Indian Red and Veneered Red (red face with gray back).

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25 size 3-16" Complete
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Money refunded if not satisfactory. Larger sizes on request. Write for free sample and booklet "Expansion Bolt Facts."

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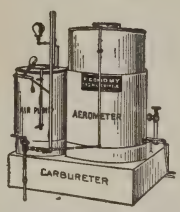

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No charging, no cleaning.
No generating, no dirt, soot, fuss or muss.
Cheaper than electricity, cleaner and safer than kerosene or acetylene (in use 16 years.)

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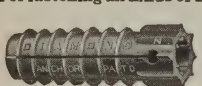
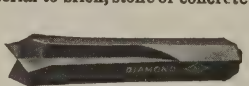
Diamond "N" Screw Anchor
For fastening all kinds of material to brick, stone or concrete



Diamond "N" Shield.



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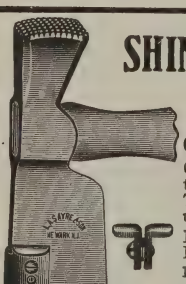
DIAMOND EXPANSION BOLT CO. 90 WEST ST NEW YORK



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WITH POSITIVE GAUGE
No. 144

OVAL HEAD. 169 POINTS.

Gauges by ¼ inches from 4¼ inches to 5½ inches. Full Polished Solid Tool Steel, the best Quality ever used in a Hatchet.

If your dealer does not carry these Hatchets we will send you one, express prepaid, upon receipt of $1.75.

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ALWAYS IN ADVANCE.

F. E. Myers & Bro., Ashland, Ohio, believe that their requisites for handling water, hay and fruits, as well as their door hangers are considerable in advance of many others as regards design, quality of workmanship, material and general selling features. Their 51st catalogue stands well in the front in its completeness, the variety and style of goods offered, and the arrangement which best serve the convenience of dealers and buyers.

F. E. Myers & Bros. are remarkably well situated for producing up to date implements. Their factory is complete and fully equipped with modern machinery, driven by electric power produced by natural gas from their own wells. Their inventive ability is indicated by the number and variety of patents which they hold, and by their meeting particular needs with specific devices or improvements. The pages of their catalogue exhibit practically only what they make entirely themselves, and their interest in other lines of material enables them to procure supplies on more favorable terms than many other manufacturers.

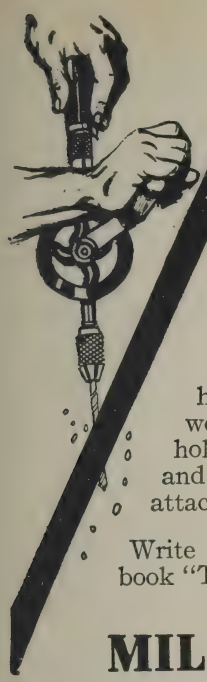
The contractor or dealer who secures this catalogue will be sure to examine it carefully, as each page presents interesting variations from the preceding one, and the catalogue will be kept as a useful reference book.

"THE HOUSE THAT JACK BUILT."

This is the title of a neat booklet printed in colors and being distributed by the Paine Lumber Company, Oshkosh, Wis., as an example of the advantage of using birch doors and trim in a small residence. There are a number of beautiful exterior and interior views in color, showing the attractiveness of birch, both for trim and furniture, as well as the details of the trim which was used in the house. It is hard to realize that work of this character and design costs little or no more than the cheaper grades commonly found on the market, and it is surprising that more contractors and builders are not more thoroughly familiar with the use of birch for this purpose.

The contractor who sends for this book will gain many useful ideas on detail and construction from it, as well as learn how he can better please his clients.

The doors used in this house are the celebrated Korelock doors, which are manufactured exclusively by the Paine Lumber Company. This company by owning its own forest reserves is able to select the very best material, both in quality and figure for their work, and they are sure in having sufficient quantities on hand to be able to use only properly seasoned materials in their work. Contractors and builders should be posted on birch as a building material, as it is readily susceptible to a wide variety of finishes, in which its beautiful grain, figuring and markings can be displayed to advantage.



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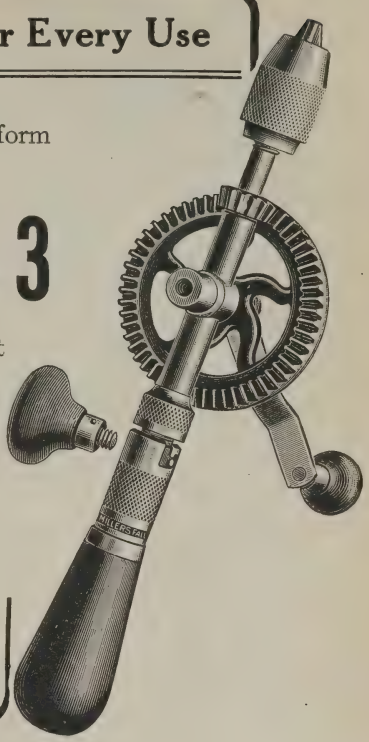
A quality tool that will perform good service always

Hand Drill No. 3

is 11 inches long and has a chuck that holds from 0 to 3/16 inch drills. Entire weight 21 ounces. Has hollow handle to hold drill points with a unique, quick and convenient method of removing and attaching handle to get at drills.

Write for our catalog and instructive book "Tool Practice"—both FREE.



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Mr. Builder—

Decorate your Stucco
Liven your Concrete Work
Beautify and Lengthen Life of Your Sidewalks

AND IN ALL YOUR CEMENT WORK

Use Bonnell Iris Aggregate

This is Crushed Granite from the beautiful IRIS (PORPHYRY) quarries—screened to all sizes for concrete, stucco and cement work.

Strongest, most desirable and best bonding aggregate for concrete work on the market—we can prove it.

IRIS PORPHYRY in its natural state is beautiful in its wealth of color and glitter and when used in concrete, stucco or cement gives a life and color that cannot be obtained with any other material. The colors—pink, green and black—in the granite give the aggregate the appearance of crushed jewels.

For Flooring this material will probably outwear marble terrazzo two to one, besides producing far handsomer effects.

For Stucco Work additional value will be given buildings through the beautiful effects resulting from the use of IRIS AGGREGATE in the mixture, also in poured concrete and cement blocks.

For Sidewalks it gives a hard beautiful finish that will last indefinitely.

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Fill out the coupon at once and mail.

ANYHOW send for sample and literature

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Herewith is $1.00 for which please send me 100 lbs. of two sizes of IRIS AGGREGATE by Freight Express as a trial or sample order. Send me prices per ton and literature.

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combine the artistic beauty of California bungalows with the structural requirements of the Northern homes. The designer is a Californian and knows the bungalow by heart.

The book is bristling with interest and suggestion for all home makers. It embodies successful, compact arrangements; popular and economical story-and-half designs; roomy two story houses of individuality and cosy camps and lodges built the Plan Shop Way.

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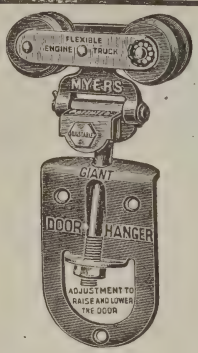

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For Tubular Girder Track

Are adjustable up or down, and in or out. Trolley Wheels are heavy turned steel, revolving on steel roller bearings, and run inside the tubular girder track. Not affected by rain, sleet or ice. Write for descriptive circulars and prices.

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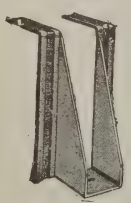
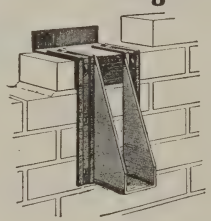


Have no Equal. Send for Catalog



No. 1. Steel Joist Hanger for Wood Header.

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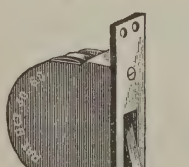
Caldwell Sash Balance



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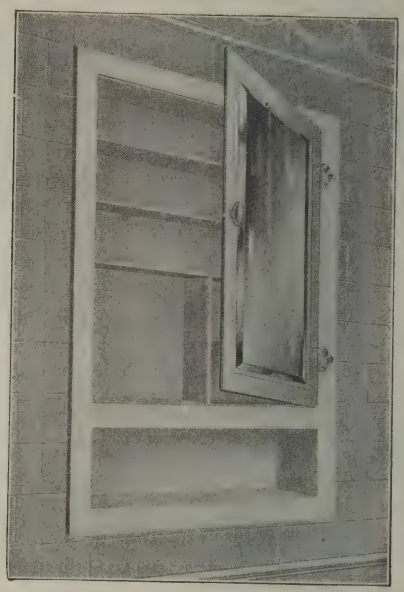
The Hess Warming & Ventilating Company, 907-L Tacoma Bldg., Chicago, are sending out a new catalogue showing their steel medicine cabinets. These cabinets are proving so popular that it has been necessary for them to provide additional factory space for their manufacture. Shipments have been made to many foreign countries, as well as to all portions of the United States.



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The catalogue shows in detail the various sizes and styles, some of which are designed to be installed in new buildings while under construction and others to be installed in old buildings where the construction does not permit building the cabinets into the wall.

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The Hess Company will be glad to send this catalogue to plumbers, hardware dealers, builders and contractors who have the installing of this class of work in hand.

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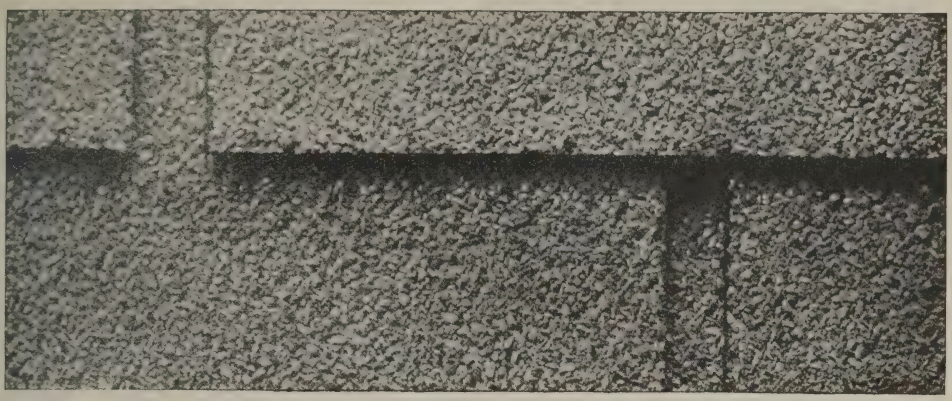

DEEP red, greenish gray and brown—rich beautiful colorings—and all simply the natural slate and granite—no dye—nothing that can either fade or wash off—

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ASPHALT SHINGLES

Are made of solid asphalt, into the surface of which chipped slate or granite is rolled until it becomes an actual part of the shingle—The result is a beautiful stone-like appearance and a wonderfully artistic and durable roof—

Flex-A-Tile Asphalt Shingles are 8 by 12½ inches in size—It only requires 424 of them to cover a hundred square feet. They are easily and quickly laid—are low in cost and will last as long as the house stands. They are also fire resisting—

We want to send you a sample free—Send us your name.

THE HEPPES COMPANY

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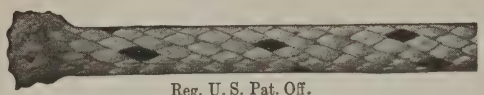
A NAT BUILDER

SAMSON SPOT SASH CORD



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Made of extra quality stock, carefully inspected and guaranteed free from the imperfections of braid and finish which destroy common cords so quickly.

The Spots on the Cord, in any color, are our trade mark. Don't be misled by imitations. Samples and full information gladly sent.

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for placing sash cord in window frames.
59 inches long, consisting of Fastener, Chain and Weight.

WHY use the old "string and nail" outfit, when the HAN-COT will do it quicker and easier?

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Quadruple Bit. Price, $5.00
Can not be used in a hand brace.

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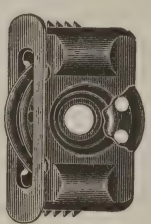
Mortised at one punch with the **Quadruple Bit** or bore four holes with a single bit and it's done.



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Saves Money Prevents Window Rattling
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Made in 3 sizes for sash weighing 35 lbs. or more

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THE CONLAN WATERTIGHT RECEPTACLE.

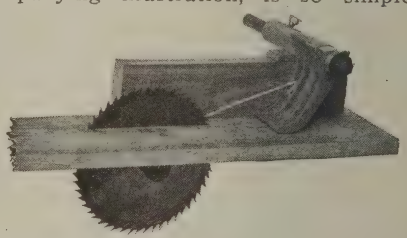
A valve closing Watertight Receptacle has been introduced by the Conlan Electric Company, 43 Murray street, New York. The valve being employed in place of the portable cover to close the opening disclosed by the removal of the plug. The closing action of the valve and valve spring is also used to make a quick break of the electrical connections when the plug is withdrawn. Another strong feature is in the means of connecting the plug to the box, which compresses a gasket (carried by the plug) on the face of the box, making a watertight joint. Therefore the operator, who is usually unskilled, is not required to do more than to make and break the electrical connections, as the box is made watertight automatically. The United States Army have adopted the device exclusively and it is also used on United States battleships and on steamships, yachts, and by railroad, mines, breweries, garages, theatres, etc., etc.

THE CONRAD SAW GUARD

If an employee in a woodworking plant received a serious injury, such as the loss of a hand, it causes more trouble, misery and expense than anyone can really figure out. An accident that is quite common in woodworking plants is the one caused by slivers flying back, at a terrific speed, into the hands of the saw operator.

While it does not always result in the loss of a hand, yet it is an accident well worth preventing, especially when it costs so little to do it.

The Conrad Saw Guard, as shown in the accompanying illustration, is so simple in



construction and operation that a glance fully explains why slivers and pieces of stock cannot fly back to the injury of the operator.

The device or guard is made of metal and easily permits the operator to slide the material through to the saw, as quickly as before, and at the same time forming a shield for the hands.

Mr. H. G. Conrad, 707 South Clinton street, Chicago, is the inventor and manufacturer of this saw guard. He claims it is right both in principle and operation and absolutely the best saw guard on the market. To make it easy for both small and large employers to secure this saw guard, Mr. Conrad quotes a very reasonable price on it.

Circulars will gladly be sent on request, showing how easily it is applied and giving price.

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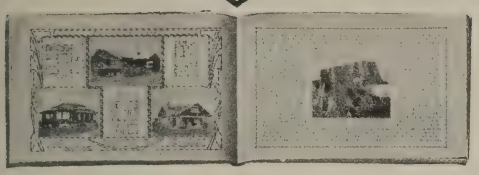

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The Bungalow covered with **Red Cedar** Shingles from "crest to foundation" has come to stay. Everybody likes it. Can be stained in any color to harmonize with surroundings.

Stain costs only half as much as paint and is put on in one-half the time. You stain a bungalow once in five years while you paint clap-boards twice.

And remember **Washington Red Cedar Shingles Do Not Warp, Rot or Decay.**

Our Bungalow Book contains Photos and Floor Plans of genuine Pacific Coast Bungalows. Every contractor, carpenter and architect should get a copy. Full of up-to-date ideas and designs.

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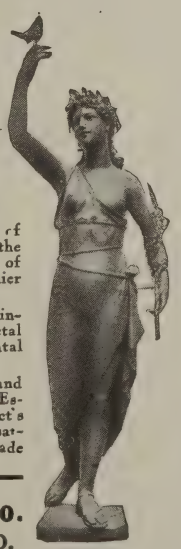

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The Boss Floor Scraper

The Boss is the only Floor Scraper made that will plane a floor without leaving a square cut where knife first starts cutting. WHY? Because the Boss is made with a gauge on front to which is attached a pear shaped wheel which raises when the machine is pulled and lets the knife down gradually. ¶ The Boss can be set for any thickness of shaving. It also can be set for any shearing cut; right or left, up or down, to suit the kind of lumber. ¶ It is guaranteed to give absolute satisfaction.

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For each individual house the owner has his individual ideas of decoration, arrangement and lighting. The latter problem is becoming more and more important as owners find that they can secure the best results at a comparatively low price.

The age of the tallow-dip and kerosene lamp is now in many districts a matter of history, but electric light and municipal gas plants are not everywhere available. Even where they are convenient a great many of our readers have found that the outfits sold by the Gloria Light Company, 1266 Washington boulevard, Chicago, Ill., possess advantages over every known system. The recent catalogues published by this company show in great detail their methods of installation and explain fully why a superior light is secured at an extremely low price. These catalogues can be obtained upon request and we would suggest that those who are not satisfied with their present lighting facilities get in communication with the Gloria Light Company and learn how they can be materially benefited at very little cost.

THE JAHANT DOWN-DRAFT FURNACE.

It is impossible to design one size of furnace that will do equally well for a five-room house, a ten-room house, a flat, a church or a school building. Some manufacturers claim to have a versatile furnace which will readily accommodate itself to any of these positions, but the better class of manufacturers find that it pays to make a number of styles and sizes, each one having its definite purposes and to which it is made especially adaptable.

The usual method of those who need a furnace has been to visit the local dealer and pick out the nicest looking one in stock. The question of capacity and adaptability is not generally brought up because it is understood that a furnace is to supply heat. As a consequence, it frequently happens that one man buys a furnace too small for his purpose, and the next man goes to the other extreme, neither one being satisfied with the results obtained, although the furnace may be doing excellent work within its limits.

The only way to avoid trouble in times like this is to select the furnace made for the purpose in view. Only the largest dealers can afford to carry in stock enough furnaces to meet the demand for the ordinary requirements. When anything unusual is required, the owner must either take what he can get or order one special.

The Jahant Heating Co., 90 Mills street, Akron, Ohio, have found that it is necessary to manufacture eight different sizes of furnaces in order to meet their trade requirements. When a definite proposition is put up to them requiring a furnace for any purpose, the conditions are carefully considered before the selection is made. In this way far better results are obtained than can be by merely selecting one which looks large enough to do the work.

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To be held in

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[Including New York State Fire Prevention Day, Oct. 9th; and Columbus Day, Oct. 12th]

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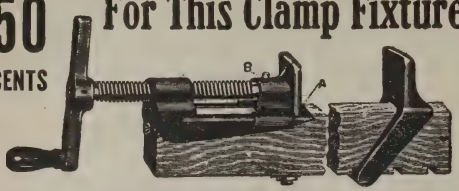
50 CENTS **For This Clamp Fixture**



It is unequaled for strength, quick action, and lasting qualities.

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Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalog. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book, "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

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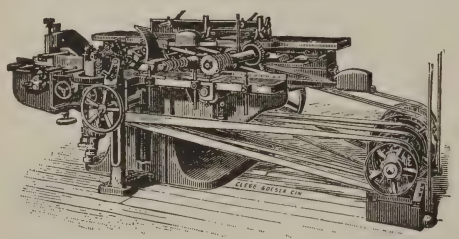

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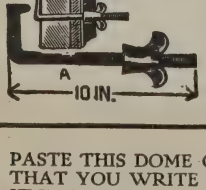

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nary furnace. In the latter, the air enters through the ash pit, passes up through the ashes and live holes, and so on to the chimney. The Jahant Down-Draft Furnace reverses this process by introducing the air above the fire in such a manner that perfect control of the combustion is secured and the operation of the furnace greatly simplified.

A recent catalogue issued by the Jahant Heating Co. gives a great many reasons why this principle is correct and why the use of a Jahant Down-Draft Furnace will solve practically any problem. This book, which also contains directions for measuring, ordering, and installing these furnaces is sent free to our readers on request.

"CERTAIN-TEED" ROOFING.

The General Roofing Mfg. Co., East St. Louis, Ill., are sending out to the trade a general prospectus showing what they expect to do in the advertising line during the coming season. A review of the last season's campaign brought out a great deal of favorable comment from dealers and users of the "Certain-Teed" brands, and indicated to them the value of their prominent trademark upon every piece of goods that they manufacture. As their product is handled entirely through dealers, they have found it a great advantage to include the jobber's or dealer's name upon the material, thus giving the local man advertising and prestige. The high guarantee which goes with "Certain-Teed" roofing has made it a comparatively easy material to sell, and the purchaser in every case realizes that there is a substantial company back of the goods.

The General Roofing Mfg. Co. is sending out a thirty-two page book containing a great many reasons why this roofing is of special interest to the contractor and giving a great deal of useful information concerning it.

BUILDERS' HARDWARE.

A long experience, forty years, has given the Orr & Lockett Hardware Co., 14-16 West Randolph street, Chicago, Ill., a reputation for accuracy in filling orders and for carrying the most complete line of builders' hardware in the country. Where with some firms it is necessary to hold up an order sometimes for days in order to supply something not carried in stock, it is seldom that shuch a contingency arises with the Orr & Lockett Hardware Co. Not being tied to any one brand of goods, they are able to supply exactly what the carpenter, contractor or builder chooses to order, or to fill the order with the best brands for any items left to their discretion.

They find that in filling an ordinary order, the goods of no one manufacturer are used exclusively, but that different pieces which are acknowledged to be the leaders in each manufacturer's line are found on their shelves, and so can readily be included.

Not the least important part of filling an order is the sorting and labeling, so that the workmen can be given the hardware for each particular place with no chance of their get-

Wood Shingles Are Dangerous

Ruins of school, Muskegon Heights, Mich. Fire of January 29, 1912, is said to have been caused by a spark from the chimney igniting combustible roof.

Insurance Engineering Says:—

"This fire illustrates a clear count against the wood shingle roof,— and yet there are those who will still argue in favor of wood shingles."

And wide-awake contractors are recognizing that wood shingles are practically obsolete, and are dropping them for the up-to-date

Cortright Metal Shingle

which is fireproof, stormproof, handsome, inexpensive, and durable. You can recommend CORTRIGHT METAL SHINGLES, and make as much or more money on them as on wood shingles, and yet feel you have done your client a real service, as they last as long as the building, and never need repairing.

Send for our catalog and prices

Cortright Metal Roofing Co.

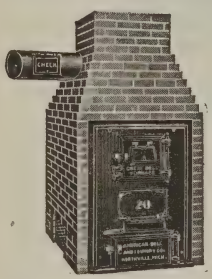
Philadelphia and Chicago

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Fireproof Metal Windows
Skylights, Ventilators
Sheet Metal Goods

Send for Catalogue No. 6

Willis Manufacturing Co.
Galesburg, Ill.



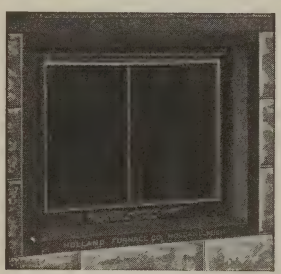
A Hot Air Furnace

For Less Than $50 Complete
FOR 5 AND 6 ROOM DWELLINGS

An unheard of Price and a most Remarkable and Indestructible Furnace. No Pipes—no Lost Heat.

American Bell & Foundry Co.
NORTHVILLE, MICH.

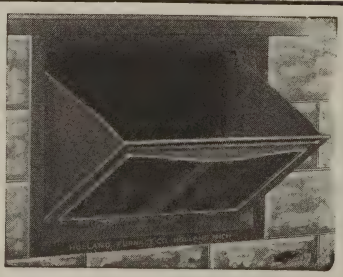
The Improved Window Chute



A Real Glass Window when closed, which is burglar proof

A Perfect Coal Chute
when open

LOCKS FROM OUTSIDE AND CAN ONLY BE UNLOCKED FROM INSIDE



Write for Proposition to Contractors and Builders

HOLLAND CO., Holland, Mich.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

ting the wrong size, style, or finish, which might cause expensive repair work, or possibly the throwing away of high-priced doors and trim. The contractor who has had trouble in the labeling of his goods will appreciate the advantage of receiving his hardware properly labeled.

The ideal way for the contractor to try out the Orr & Lockett Co. is to send them the plans and specifications for a job and get a figure on the hardware complete. The care with which an estimate is prepared will readily indicate to the contractor the care in which the order will be filled.

METAL STORE FRONT CONSTRUCTION

The average merchant seldom stops to think how much an attractive store front means to him as an advertisement. Hundreds of dollars are spent on newspaper advertising and other forms of publicity, while the actual front of the store to which attention is being called does not attract the prospective customer enough to cause him to enter. In this way the advertising is practically wasted and it is all the more deplorable since a store front of attractive appearance can be easily installed with comparatively little cost.

The Detroit Show Case Co., 481 Ford street, W., Detroit, Mich., who control the Petz system of metal store front construction is sending to interested contractors and builders their latest catalogue which shows the great range and possibility of this form of construction.

The progressive contractor is at this season of the year interested in securing work for the coming year. A walk through the average small city and town, as well as our large cities, will quickly convince one that there are a great many store fronts which could readily be made much more attractive, and it should be the duty of the progressive contractor to call the attention of the owner or storekeeper to the excellent results that can be obtained at such slight cost. One need not be an advertising man to show the advantages of a neat front. The attention of the merchant can probably be called to someone in his immediate vicinity who is profiting by having a modern front on an otherwise old building.

We would suggest that contractors, carpenters and builders who wish to increase the number of their jobs, as well as to improve the appearance of the main streets in their towns investigate this method of store-front construction that they may intelligently present the matter to their home merchants.

"FROM FOREST TO YOU."

This peculiar heading is the title of a neat booklet being sent out by the Peter J. Seippel Lumber Company, Dubuque, Ia. It explains in detail their special propositions to NATIONAL BUILDER contractors and builders.

This company have been for many years supplying their district with the finest grades of hardwood flooring and millwork, as well as lumber, shingles, lath and other building supplies. Their long experience has shown them the best ways to work material to ad-

J-M TRANSITE ASBESTOS SHINGLES

Last as Long as the Building—Never Need Attention

RESIDENCE OF C. B. MANVILLE, PLEASANTVILLE, N. Y.
COVERED WITH J-M TRANSITE ASBESTOS SHINGLES
Betts & Hosmer, Architects - - - Milwaukee, Wis.

In durability J-M Transite Asbestos Shingles are not equalled by any other form of shingle manufactured. They are composed of pure Asbestos and the best grade of Portland cement—two fireproof minerals. And as the shingles harden and improve with age instead of deteriorating as other kinds do, they will last as long as the building on which they are placed.

The fact that J-M Transite Asbestos Shingles are molded into a solid, compact mass, prevents curling, exfoliation and disintegration.

They are fire-proof, water-proof and practically wear-proof, and require no attention after being laid.

We furnish them in three colors—natural gray, Indian red and slate.

Write Our Nearest Branch For Descriptive Booklet and our proposition to dealers.

H. W. JOHNS-MANVILLE CO.

Manufacturers of Asbestos and Magnesia Products — ASBESTOS — **Asbestos Roofings, Packings, Electrical Supplies, etc.**

Albany	Chicago	Houghton	Omaha	Philadelphia	San Francisco
Atlanta	Cincinnati	Houston	Milwaukee	Pittsburgh	Seattle
Baltimore	Cleveland	Indianapolis	Minneapolis	Portland, Ore.	Syracuse
Birmingham	Dallas	Kansas City	Newark, N. J.	Richmond, Va.	Tacoma
Boston	Denver	Los Angeles	New Orleans	Rochester	Washington
Buffalo	Detroit	Louisville	New York	St. Louis	Wilkesbarre
	Duluth	Memphis	Oklahoma City	St. Paul	

For Canada:—THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED
Toronto Montreal Winnipeg Vancouver

1549

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

STEEL CEILINGS

Are you figuring on using a medium priced Steel Ceiling? Get our catalog by all means. It shows a line of beautiful ceilings of sufficient variety to please almost any individual liking, yet at prices surprisingly low.

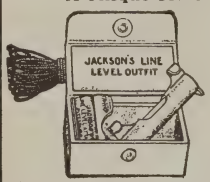
The possession of this catalogue and a knowledge of our line and prices will save you many a dollar if you are an occasional or frequent buyer of Steel Ceilings.

Write for It Today

INDIANAPOLIS CORRUGATING CO.
Indianapolis, Indiana

THE JACKSON ALUMINUM LINE LEVEL

A Unique Time and Labor Saving Device



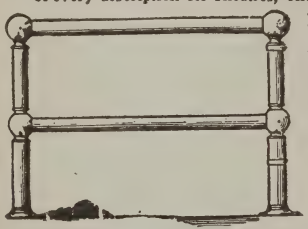
It takes the place of the old-fashioned sixteen-foot straight edge, yet it can be carried in your vest pocket. ¶ No contractor, builder, carpenter, mason, bricklayer, architect or plasterer should be without one. ¶ Just stretch your line and hang the level on it—it's positively accurate. ¶ The complete outfit is put up in a neat leatherette case and consists of the level with a 40-ft. line, also a spring clamp for attaching the level to a steel square or pocket rule, thereby serving as a plumb rule or bench level. At your hardware dealer's or sent for $1 postpaid. By registered mail 10c additional.

JOS. WOODWELL CO., Sole Agents, 201-203 Wood St., Pittsburg, Pa.

Write for Catalog of Woodworker's Tools

BRASS RAILS

Of every description for Theatres, Churches, Offices, Etc.



HAND RAILS
PUSH PLATES
KICK PLATES, Etc.
BRASS FRAMES
BRASS EASELS
BRASS GRILLES

For Theatre Lobbies.

LET US BID ON ALL BRASS WORK

Inducing Prices, High Class Workmanship. Send us list of requirements.

THE NEWMAN MANUFACTURING CO., | Established 1882
717-719 Sycamore Street, Cincinnati, O.

TO KEEP OUT DAMPNESS

Paint Your Concrete and Brick Buildings with TOCH BROS.

R. I. W. PAINT

"Remember It's Waterproof"

and your cement floors with **TOCH BROS. Cement Filler** and **Floor Paint**, Pat'd. Proof against Water, Acid, Fumes or Alkali. **Special elastic compound for each specific purpose**

The Garden City Sand Co.
709-711 Chamber of Commerce, Chicago

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

vantage and how to obtain the best material for each specific purpose.

The plant of this company is located advantageously for shipping to any part of the country, and they enjoy a patronage over a wide area. Their reputation has been built up from the fact that their yards contain ample material to fill any order for lumber, lath, shingles, etc., at a moment's notice, and their mills have been built with the idea of turning out only the best quality.

Contractors and builders who are considering the erection of one or more buildings should learn from the Peter J. Seippel Lumber Company just why a purchase of material from them would be to great advantage in quality and price.

THE AURORA CUPOLA VENTILATORS.

The Aurora Cupola Ventilators are made especially for stable ventilation. They are manufactured of the best galvanized steel, have screens on the inside, protecting against birds entering, and are not only very handsomely designed and well made, but are mighty easy to put on. The Aurora Cupola Ventilators are shipped in "knock down" form and are carefully packed in boxes. These ventilators are sold by hardware dealers and your own dealer probably can show one now.

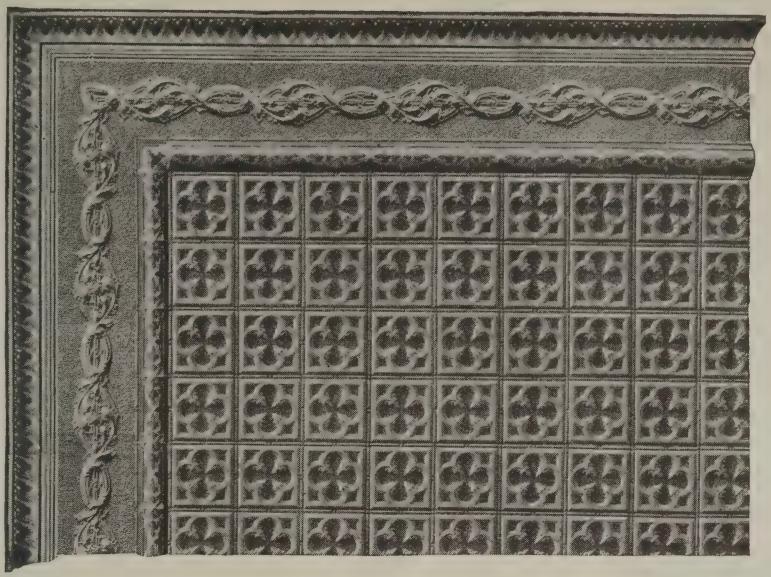
If not, circulars will be sent fully describing these ventilators. Messenger & Parks Manufacturing Company, Aurora, Ill., are the manufacturers.

A FIRE EXPOSITION.

The continual hammering of the NATIONAL BUILDER and other building magazines on the conservation of resources and the prevention of fires will have definite results this fall in the shape of a fire exposition and International Conference of Fire Prevention, Protection and Extinguishment. This exposition and conference will be held in Madison Square Garden, New York, from October 2d to October 12th, inclusive, and is the first meeting of this character to be held in this country.

In connection with the meetings, the civil authorities of New York City have set apart October 9th as Fire Prevention Day, at which time the school children and students in the various schools and colleges will be shown the principles of fire protection, prevention, and extinguishment, and an earnest effort made to prevent many of the preventable fires in the future.

The enormous fire loss of this country, which is a national disgrace, as it is several times as large as that of any other civilized country, can be and should be greatly cut down by comparatively simple means. The results of this exposition, which will be addressed by leading architects, engineers, insurance men, fire chiefs and fire fighters throughout the country will probably develop a national program for the education of the people along these lines. It is not necesarily



Edwards Metal Ceilings and Walls

CARPENTERS CONTRACTORS AND BUILDERS

Here is a chance for you to build up an independent, profitable business for yourself right at home. Many agents are now devoting their entire time to selling our Metal Ceilings. Others have made big profits simply devoting part of their time to selling and applying our Metal Ceilings and Walls. *Write us to-day about your territory.* Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that some one else will be given your territory. *Don't delay. Write today for our special agents' proposition and large, handsome catalog of attractive designs.*

The Edwards Manufacturing Company

"The Sheet Metal Folks"

430-450 Eggleston Avenue, Cincinnati, Ohio

Largest Manufacturers of Metal Ceilings, Metal Shingles, Steel Roofing and Siding in the World

Eastern Representatives: The W. H. Daycock, Jr., Co., 81-83 Fulton Street, New York

Branch Office and Warehouse: 1625-1627 Pacific Avenue, Dallas, Texas. J. F. Agnew, Manager

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

LUFKIN

Steel Measuring Tapes

With Instantaneous Readings can be used at all times and under all conditions with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catalogue No. 12.

THE LUFKIN RULE CO.

SAGINAW, MICHIGAN, U. S. A.

NEW YORK - - - - - WINDSOR

ARCHITECTURAL DRAWING MADE EASY

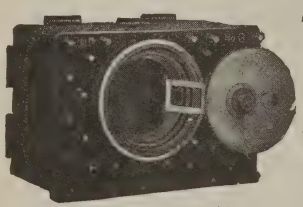
By I. P. HICKS

94 pages, illustrated and cloth bound, $1.00 postpaid. The best yet on drawing plans. Your money back if you are not satisfied with this book. Get a copy of

HICK'S ESTIMATORS' PRICE BOOK and your troubles in estimating are over.

170 PAGES—CLOTH BOUND—PRICE $1.00

I. P. HICKS, Box 22, Station A, Omaha, Neb.



The GALE WALL SAFE

It makes your Valuable Papers, Jewelry and Silver secure against Porch Climbers, Petty Thieves, Fire, etc.

No Home or Apartment House complete without one. It has a combination lock.

Write for Descriptive Matter Today

WILLIS MFG. CO., Galesburg, Ill.

FRED LIEBRICH, Agent for Cook County
1102 Monadnock Bldg., CHICAGO, ILL.

PRODUCERS OF

ROOF SLATES

BLACK — GREEN — PURPLE — RED

SLATE BLACKBOARDS Guaranteed Strongest and Best Finish.

Pamphlet with setting instructions on application.

The E. J. Johnson Co., Main Office: 38 Park Row, New York
Branch Office: 626 Park Bldg., Pittsburgh. Quarries: Pennsylvania and Vermont

ART of PRACTICAL WOOD CARVING

By Fred T. Hodgson.

PRICE: 12MO, CLOTH $1.50; HALF LEATHER $2.00

THE lessons given in this new book lead the young workman by easy steps until he is able to turn out work of a creditable character. The use and care of carvers' tools are given and explained and the tools described and shown by illustrations, with methods of sharpening and honing the tools. All kinds of appliances are shown, described and illustrated, for holding the work, and for preparing the tools and finishing up the carvings. The various styles of carving are fully described, such as Flat Carving, Chip Carving, Incised Carving, Scratch Carving, Figure Carving, Carving in Relief, Round Carving and Jewelry Carving. *Sent postpaid on receipt of price, by*

HODGSON BOOK CO, 542 S. Dearborn St. Chicago

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

the so-called fireproof buildings which will cut down the fire loss, although there is a great room for improvement along this line, but there are many places throughout the building line, as well as in everyday life where slight changes in methods and construction will materially reduce the fire risk.

The selection of Madison Square Garden, one of the largest exhibition places in the world, for this exhibition indicates the widespread interest which is being taken, and we predict that the Garden will be crowded during the exhibition time with all classes of people, all interested in the subject of fire prevention.

During the exposition there will be life saving exhibitions, showing the methods in use in the various large cities for the saving of life during fires, and also of new inventions designed to conserve human life and property.

While it is possible that many of our readers will be able to attend this exposition, we believe that all those who possibly can, should attend this exposition, as the questions involved are ones which are of vital interest to the country.

EVERWEAR PAINTS.

The fact that paint is required as a protection to wood and metal work on all buildings exposed to the weather causes every contractor and builder to consider the question of durability. Too frequently an attempt is made to specify exactly what the paint shall contain, but all this has little effect upon the actual durability of the paint itself. The care in manufacture has far more to do with it, as intimate mixing of the ingredients is absolutely necessary. The best materials must be used in the right proportions, otherwise the best results cannot be expected.

Among the paint concerns who have carefully worked up a reputation for making durable paints of the highest quality are Crosby, Frank & Co., 297 S. Peoria street, Chicago, Ill. Under the trade name of Everwear Paints, they are manufacturing a complete line of ready mixed house, barn, floor, carriage, waggon and implement paints, as well as stains for interior trim and shingles, and also for varnishes for every purpose.

Among the materials which they prepare is their Everwear Sanitary Flat Wall Paint, which has a washable, permanent, hygienic finish, especially adaptable to finishing wallboard and similar preparation.

The catalogue of Crosby, Frank & Co., is beautifully printed in colors and contains besides the usual color plates showing the many colors in which the various paints can be obtained, a valuable amount of information regarding color combinations and suggestions for selection of shades, how to ascertain the quantity of paint required, and examples of the best methods of applying the various grades to different surfaces. This catalogue will be sent to those who write to Crosby, Frank & Co. for it.

Genasco

THE TRINIDAD-LAKE-ASPHALT

Ready Roofing

Trinidad Lake asphalt is what makes roofing last. This *natural* asphalt, the same that has long withstood the wear and tear on city streets, is used to make Genasco Ready Roofing.

Genasco is sold ready to lay without experienced help. It has different surfaces (both mineral and smooth) for different purposes, but the life of it is always genuine Trinidad Lake asphalt. Ask your dealer for Genasco. Write for samples and the valuable Good Roof Guide Book—free.

The Kant-Leak Kleet, for smooth-surface roofings, prevents nail-leaks and securely waterproofs the seams without cement.

GENASCO · THE STANDARD OF EXCELLENCE · TRADE MARK

THE BARBER ASPHALT PAVING COMPANY

Largest producers of asphalt, and largest manufacturers of ready roofing in the world

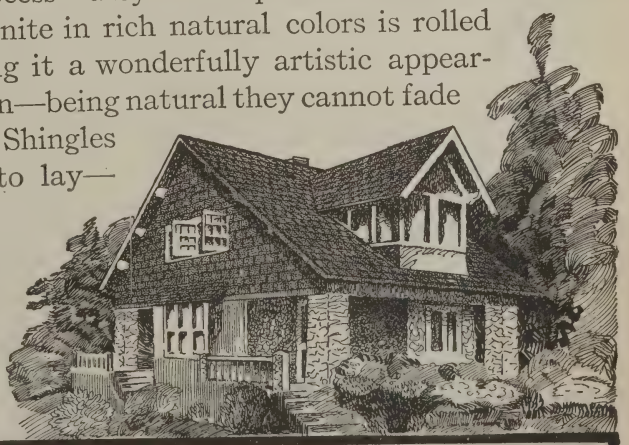
PHILADELPHIA

New York San Francisco Chicago

THE WINTHROP IS TAPERED
LOTS OF ASPHALT SHINGLES—ONLY ONE OF THEM **TAPERED**

Winthrop Asphalt Shingles

Are made by a patented process—they are tapered—lie flat and close together—chipped slate or granite in rich natural colors is rolled into the exposed surface, giving it a wonderfully artistic appearance. Colors are red and green—being natural they cannot fade or wash off. Winthrop Asphalt Shingles are very durable—very easy to lay—low in cost and highly fire resisting.

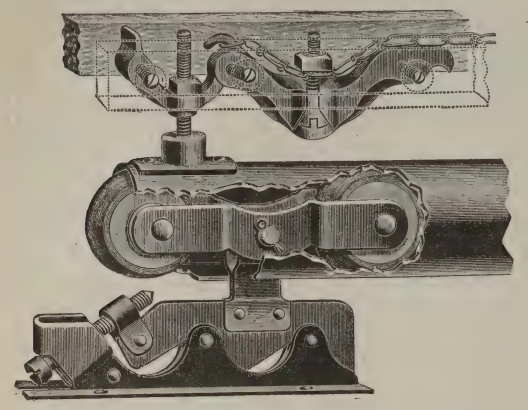


Let Us Send You a FREE Sample

Winthrop Asphalt Shingle Co.
10 61st STREET ARGO, ILLINOIS

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT BUILDER



The ONE Perfectly Adjustable Door Hanger

Two adjustments—one for the hanger—one for the track. Both ***instantly*** accessible with a screwdriver. Either end of the track instantly raised or lowered as desired, from the center of the door opening.

The CANNON BALL House Door Hanger

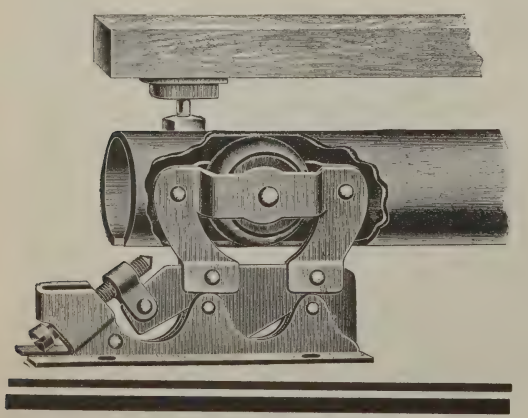
Frictionless, noiseless, practically indestructible wheels. Either single wheel or tandem. Hanger and plate for attaching to door are made of steel.

Track—14 gauge steel 2¼″ inside diameter, slotted ¼″ on under side.

Furnished with two-piece hardwood header.

Write for special circular and full description

Hunt, Helm, Ferris & Co.
6587 Hunt Street
Harvard **Illinois**



CYPRESS FOR CANOES AND BOATS.

Volume nineteen of the Cypress Pocket Library treats in a most interesting manner on the use of Cypress for boats and canoes. Photographs are shown of a large number of boats now in commission built of Cypress and which have required few or no repairs through a long period of usefulness. A large number of plans for house boats, launches and nautical equipment are shown, making the booklet valuable to anyone interested in this line.

We understand that the Southern Cypress Manufacturers Association, 1212 Hibernia Bank Bldg., New Orleans, La., will send this booklet to such of our readers as are interested.

A ROOFING INCIDENT.

Amos Johnson was in a particularly good humor, but when he made an examination of the roof of his new barn which he had put on only two years before, he muttered several times to himself.

"It beats all tarnation," he said, "how it is that I have to be put to the trouble and expense every couple of years patching up and putting on new roofs.

"Here's this new one with big damp spots under it in half a dozen places, where the rain has soaked through. The man that sold it said it would last for years. Was on hardly half the first summer before it begun to curl up, and as soon as the first cold rain struck it, it cracked.

"Here's winter coming on and I'll have to spend nearly as much to have the roof fixed as it will cost to put on a brand new one. It's funny that some smart fellow can't invent a roof that won't crack, break, rattle off and leak."

"Hello, Amos," shouted the jolly voice of Henry Smith, Amos Johnson's nearest neighbor, "you look blue all over."

"I am," answered Johnson, "and when I see that storekeeper again that recommended me to take the roofing that's on this barn just because it was a little cheaper, I'll wallop him.

"Has been on only a little over two years and it leaks in a dozen places."

"Why, I had my house, barn, chicken pens, corn-cribs and all my other outbuildings roofed six years ago," said Farmer Smith, with a chuckle, "and I haven't seen a speck of a leak since.

"I used to have the same trouble that you have, before I put this kind on. Every couple of years the leaks would begin and every four or five years it was a new roof. Mother and I were only talking about it the other night."

"What is the name of your roofing?" inquired Farmer Johnson, anxiously.

"Genasco Ready Roofing," said Farmer Smith. "It's made of natural Trinidad Lake asphalt, which makes it heat-proof, cold-proof and water-proof. The weather can't affect it.

"I'll order it at once," said Farmer Johnson, "and if that store-keeper tries to sell me anything else, I'll carry out my threat for sure."

BIRCH
AMERICA'S FINEST WOOD

¶ **BIRCH** gives *lasting satisfaction* for all interior work. Fine grained and hard, it takes a brilliant, satiny polish in natural red or yellow tones, while all stains are applied easily and permanently.

¶ **BIRCH** finish does not warp or shrink out of place, neither does it mar or lose its color. **BIRCH** DOORS, CASING, BASE, TRIM and FLOORS are pleasing and durable.

¶ Such a variety of Beautiful and Harmonious effects can be produced, that a house finished throughout in **BIRCH** fills every requirement and is in the best of taste. The Architect who specifies **BIRCH** makes no mistake. Its quiet elegance appeals.

¶ **BIRCH** costs less and is worth more than any one of half a dozen expensive imported woods.

¶ THE **BIRCH** BOOK of the Northern Hemlock and Hardwood Manufacturers Association shows many designs for the use of **BIRCH.** *Write For It Now.* It will aid you in specifying and buying.

"Department D"

NORTHERN HEMLOCK
& HARDWOOD MANUFACTURERS ASSOCIATION
WAUSAU, WIS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

AN ADVANCE IN STORE FRONT CONSTRUCTION.

There are several features in a first-class store front which appeal to the practical business man. The front shown with this article embodies several features in lighting and attractiveness, which are worthy of careful consideration. It will be noted that there is very little space taken up by bars, so that the maximum light is given to the interior and there is nothing to detract from the exhibit of the goods in the windows.

The Voltz Mfg. Co., 1100 S. 8th street, St. Joseph, Mo., manufactured the bars and frame for the windows shown in the basement and first story, and the attractiveness of the front is largely due to the neat design which they furnish.

It will be noted that the construction carries the glass front clear down to the side walk, thus utilizing as well as lighting a part of the basement. The excellence of this construction must be seen to be fully appreciated.

The Voltz Mfg. Co. have an interesting catalogue showing in detail the construction of their bars and fronts which will appeal to the contractor and builder, as well as to the owner and designer. The cut shown above indicates what can be done with an old building to make a store attractive.

GRAND BOOK OF PLANS.

The Gordon-Van Tine Company, 625 Federal street, Davenport, Ia., are sending out to contractors and builders a new plan book which they have prepared at great expense. This book contains an excellent collection of plans for residences, many of them especially designed for suburban and country homes. In addition to this there are plans for graneries, barns, poultry houses and various outbuildings for the farm.

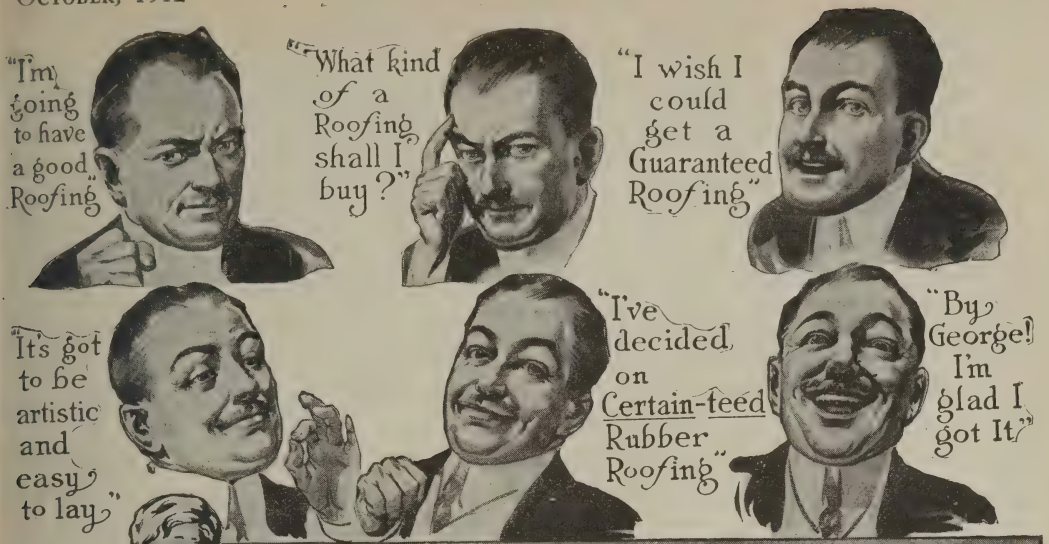
These plans have been selected after forty years experience in supplying contractors and builders with millwork and building materials of the best quality. They are, therefore, plans which have already been built from and are guaranteed by the Gordon-Van Tine Company to be correct as to dimensions and construction. Accompanying each plan is a detailed cost for the material necessary to erect the house, and the Gordon-Van Tine Company will supply all of the necessary material for a given price.

Those of our readers who have had experience with the ordinary book plans will find in the Gordon-Van Tine edition a great contrast. The specifications which accompany the plans and photographic cuts describe very clearly the house, its construction and the peculiar advantages of that particular plan.

The Gordon-Van Tine Company advise us that our readers can obtain this book free on request.

The millwork catalogue for home builders, which includes everything in sash, doors, roofing and building materials is possibly a necessary accompaniment to the book of plans, and should be asked for at the same time.

Those who wish to improve or decorate and paint their buildings should have the Gordon-Van Tine special paint catalogue, as well as the two previously mentioned.


"I'm going to have a good Roofing"
"What kind of a Roofing shall I buy?"
"I wish I could get a Guaranteed Roofing"
"It's got to be artistic and easy to lay"
"I've decided on Certain-teed Rubber Roofing"
"By George! I'm glad I got It"

"The Certain-teed Guarantee is thoroughly dependable and is better than any test you can make"

THE faces above tell a true story. The owner of a ***Certain-teed*** Rubber Roof can afford to wear a smile because he has bought a *better* roof for *less* money.

Certain-teed Rubber Roofing

Quality Certified *Shingles or Rolls* **Durability Guaranteed**

In selecting a roof covering bear in mind Quality, Durability and Price. ***Certain-teed*** Rubber Roofing is made only of the best materials. In the General's laboratories trained chemists make hourly tests of all materials used, insuring a uniform, high-grade quality at all times. The user of modern, ready-to-lay ***Certain-teed*** Rubber Roofing need not worry about durability—the manufacturer backs his product with a written 15-year guarantee.

The "General" Says:

"Roofs don't wear out, they dry out. Don't buy roofing by the smell, taste, bending or tearing it—or any other fool test—let me tell you a better, safer way. "I have originated a method of standardizing quality and value by putting a *Certain-teed* label on every roll. *Certain-teed* Roofing is guaranteed not to dry out and the *Certain-teed* Guarantee is thoroughly dependable and is better than any test you can make.

"This is just my way of protecting you, and makes it possible for you to get roofing with the quality certified and the durability guaranteed. It prevents you from buying inferior roofings and thinking they are the best."

If your lumber, hardware or building material dealer does not happen to handle *Certain-teed* Rubber Roofing, send us his name and we will tell you where you can get *Certain-teed* Roofing—or better still, we'll arrange for your own dealer to supply you.

Write today for valuable free book, B-S-5, "How to Build for LESS Money"

General Roofing
U. S. A.'s Largest Manufacturer of Roofing and Building Paper.

GENERAL ROOFING MANUFACTURING CO.

York, Pa. Marseilles, Ill. East St. Louis, Ill. Minneapolis, Minn. San Francisco, Cal. London, Eng. Winnipeg, Can. Hamburg, Ger.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Short Length Lumber and Contractors

By JACK DAHLTON

Not so many years ago the Short Length didn't meet with much success. Some Full Length Gink was always on the job ready to stick a spear into the Short Lengths plans or gizzard. Only the Full Lengths had any show.

Across the lake at Harborville, there are two contractors, both building from twenty-five to fifty houses a year. One always had the money to meet the pay roll without worrying himself sick. Some way he seems to be getting on better than his friend. The fact is, he's the Full Length, who knows how to use the Short Lengths. He's the Full 16 Footer that hires a boy on every fair sized job. A lot

Using the Short Lengths From the Pine Cone.

of people think it's just to give a job to Bill Jones' son and Mr. 16 Footer lets them think so. But all the time the boy is busy sorting out 6-inch blocks, 12-inch pieces, etc., to hand to the higher priced workmen when there's a narrow space around a window or somewhere else to be filled in. Then there are other things a boy on the job can do to earn twice his wages.

Well, Mr. Full Length Contractor got the bright idea about saving on lumber

CARPENTER MOUSE CHAIN

48 inches long, fitted at one end with patent sash cord fast, at other end with lead weight.

Price 30 Cents Postpaid

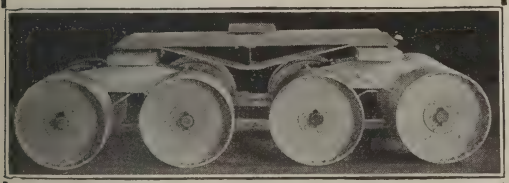
FREE

Our No. 5 Builders' Hardware Catalog and Net Price List.

We do not sell to contractors or carpenters in Cook County, Illinois.

REHM HARDWARE COMPANY
1503 Blue Island Ave.
Chicago, Ill.

Move the Old House to Another Lot
Instead of Wrecking It
You Can Make More Money by Doing So



THE LA PLANT HEAVY HOUSE MOVING TRUCKS ARE MADE OF STEEL

On scientific lines—are interchangeable so they can be worked singly, in pairs or in fours.

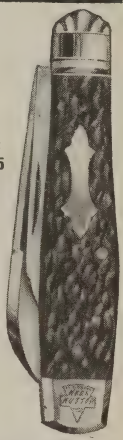
WRITE FOR CATALOG N

and see how easy it is to wheel a building a mile in a day—and how little the cost is for La Plant outfit compared with the profit to be made in moving houses instead of wrecking them.

LA PLANT TOOL CO.
900 E. Nevada St., Marshalltown, Iowa

Buy a Real Pocket Knife

E. C. SIMMONS KEEN KUTTER CUTLERY TOOLS



No. K2613
PRICE $0.85

Buy real quality, long service and satisfaction in a pocket knife by insisting that it bear the 45-year famous trade mark

KEEN KUTTER

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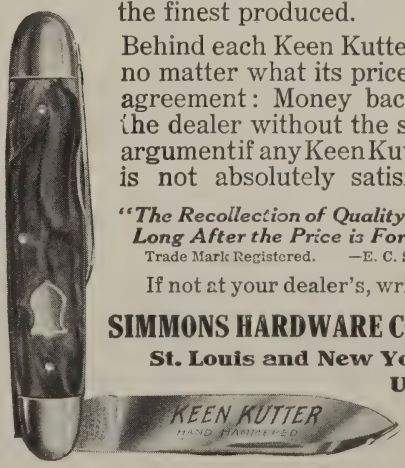
PRICE $1.00



Made of the finest cutlery steel, with strongly built handles in many styles, Keen Kutter Pocket Knives are guaranteed the finest produced.

Behind each Keen Kutter Knife, no matter what its price, is this agreement: Money back from the dealer without the slightest argument if any Keen Kutter tool is not absolutely satisfactory.

"The Recollection of Quality Remains Long After the Price is Forgotten."
Trade Mark Registered. —E. C. SIMMONS

If not at your dealer's, write us.

SIMMONS HARDWARE CO., Inc.,
St. Louis and New York,
U. S. A.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

wherever he could on a job from The National Builder, the paper he subscribes for and believes in. It printed an article on Short Length Sheathing and Siding and this Full Length Contractor tumbled, and at once saw the bunch of dollar bills hanging on every job he got. He quit ordering 16 foot lengths simply because "they cut to good advantage." He found that a lot of Short Length Contractors just loved to see their carpenters take twelve, fourteen or sixteen foot pieces of shiplap and cut them into 6 inch blocks for special places. Mr. Full Length Contractor found out that the big mills are turning out quite a lot of short length material—that these Short Lengths are always very high grade stuff, for "the shorter the length, the better the grade."

This Full Length Contractor figured out every building after learning about the good short length lumber he could get at a lower price, and on which he could save on labor also.

For instance, Mr. Full Length Contractor measured the short length sheathing and siding required to board up between windows, etc., of a one-story building. The dwelling contained about 1,800 superficial feet of wall space, no allowance being made for openings. The quantity of short length lumber was computed without allowance for lap, and he found that about 30 per cent of the sheathing was in less than 8-foot lengths.

This is not an exceptional case. Nearly every dwelling put up affords similar striking examples of the possible economies arising from the intelligent use of short length stock.

So this Full Length Contractor quietly orders short lengths from his lumber dealer. It is kept nicely assorted. When a workman needs a 5 or 6 foot piece, the boy has it ready at that particular spot for him. The workman is not allowed to saw it off a 16 foot piece, which costs the contractor a lot more per thousand than the short lengths.

And so it goes. Materials that were scorned years ago are now proving to be the money makers for those who will take the trouble to learn about them.

It's the Full Length men who are glad to be the first to use the short length lumber. They are the ones who will have the full length bank accounts.

It's these Full Lengths and the Short Lengths on every job who are keeping the pay rolls rolling.

It's these Full Lengths who are today changing the map in the buying and selling world of building materials. They are the Sixteen Footers who advise the property owners what is best for them to have in the new homes. They are the boys who are on the job and know where the mail man leaves the bundles of Blue Prints. They are glad to tell the new Blue Print owners about the new materials. They are first to go over those house plans with the perspective owners. Their advice and specifications have the weight to get some manufacturer an order, or leave some other material on the dealer's shelves. A lot of these Full Lengths are specifying and buying from the National Builder advertisements. It pays them to do so.

Amatite ROOFING

Mineral Surfaced— Needs No Painting

EVERYTHING about Amatite appeals to the man with common sense. He can see its superiority at once—the real mineral surface ***which never needs painting;*** the two layers of Pitch which is the greatest water-proofing material known; the two layers of heavy Tarred Felt—all these contribute to the popularity of Amatite.

We can make Amatite better and cheaper than anyone else on account of our greater facilities, and consequently we sell it at a surprisingly low figure.

Simply the fact that it needs no painting is enough to make a man sit up and take notice—especially the man who has spent time and money in painting and repainting smooth surfaced roofings.

Write today for further information.

Barrett Manufacturing Company

New York Chicago Philadelphia Boston
St. Louis Cleveland Pittsburgh Cincinnati
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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

YOU CAN'T MAKE 'EM RUST!

NEVERUST BRAND

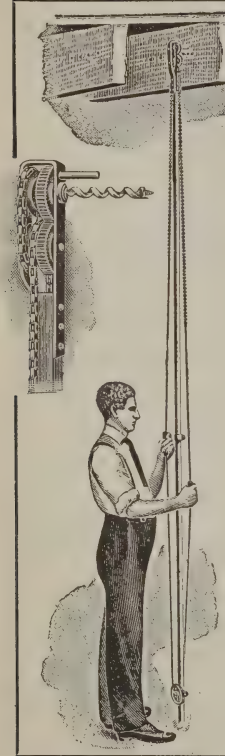
Galvanized Nails

have for half a century held the lead with the marine trade of the continent. They are all that the name implies —Hot Dipped Galvanized—Smooth and Free from skin cutting edges. They cost no more than the shoddy kind. Insist on Hot Galvanizing.

The blame for defective work, Mr. Builder, is laid at your door. Your customer expected a Rust Proof Nail when he specified Galvanized. If your Nails rust there is bound to be complaint. The dealer may have been imposed upon or he may have deceived you. You can call him to account. But in the meantime you have a dissatisfied customer. You can avoid such difficulties by insisting on our **Neverust Brand Hot Galvanized Nails.** They outlast the material into which they are driven. *Write for Booklet.*

WILCOX, CRITTENDEN & CO., Inc.

Established 1847. **MIDDLETOWN, CONN.**



A Minute's Delay

in boring a hole means a larger time loss on a big contract—and time means money. The cost of a

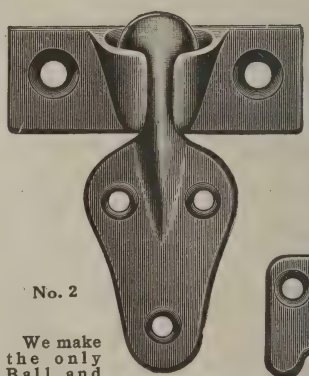
Standard Boring Machine

is saved soon. It operates perfectly in hard wood or when adjusted to difficult angles. It saves the workman many hours of work in cramped positions, ladder climbing, etc. Our booklet will tell you more about it. Send for one.

Ford Auger Bit Co.

Holyoke, Mass.

STORM SASH AND SCREEN HANGER Nos. 1 and 2



No. 2

The time is drawing near at hand when carpenters and builders begin putting up storm sash and it might be well to say that the best and most convenient goods are always the cheapest in the end.

We make the only Ball and Socket Hangers on the market. One trial will convince you that they are the best.

No. 1

Our No. 1 Fastener is made of the best steel wire. It holds the sash firmly against the blind stop and prevents rattling.

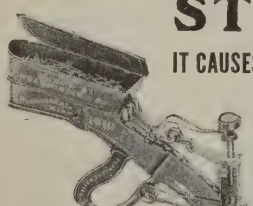
Manufactured by the

Diehl Novelty Company, SHEBOYGAN, WISCONSIN

Send for Catalogue

STOP MOUTHING NAILS

IT CAUSES SERIOUS DISEASES OF MOUTH AND STOMACH



Pearson's Automatic Shingle Nailer will carry nails in a sanitary way—and at the same time make it possible for you to drive more nails—do it with gloves or mittens on—and save you money on every job—works well on roofs of any pitch—holds between 500 and 600 nails.

PEARSON NAILERS are made in two sizes.

The Blue Nailer is for common 3d, No. 14 gauge wire nails and the Red Nailer is for the **galvanized** 3d, No. 13, 1¼ in. wire nails. Order from your dealer or send **$5.00** for either one—express prepaid. Money cheerfully refunded if Nailer is not as represented. *Write for Circular "N."*

PEARSON MFG. CO. ROBBINSDALE, MINN.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

WHEN YOU GET TO **SASH CORD** use **SILVER LAKE**

and insist upon getting it from your dealer. To insure you against substitution, we stamp our name upon every foot of our cord. Carried by all dealers.

SILVER LAKE BRAIDED SASH CORD was originated by us, and for forty years has been recognized as **THE STANDARD**

Established 1869

Let Us Solve Your Hanger Problems!

No. 29
Richards Gem

We make a hanger for any door that slides.

Richards-Wilcox Trolley Hangers are the result of our thirty years of hanger making experience.

The shape of track, trucks, wheels and pendants shows our careful study of your customers' requirements. Don't experiment, get the goods with a backing—a knowledge behind their make.

Sold by the Hardware Trade

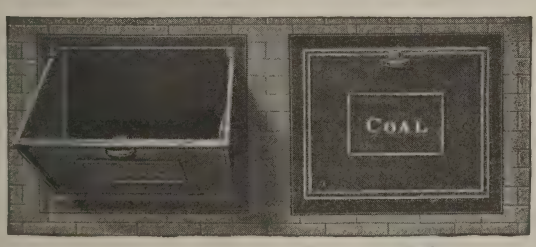
RICHARDS-WILCOX R&W AURORA TRADE MARK

This trade mark should be your guide to placing hanger orders.

Have you catalogs?

Richards-Wilcox
MANUFACTURING CO.
AURORA, ILL. U.S.A.
Door Hangers and Hardware Specialties

CANTON SELF-LOCKING BURGLAR-PROOF COAL CHUTE



Locks automatically on inside when hopper is closed. Double locked on outside by special key furnished. Can be opened without crawling over coal pile. No battered sash and window frames. Substantially constructed and neat in appearance. A credit to any home or building. Made in three sizes.

Write for Booklet "B-5" containing a list of building accessories of interest to you.

THE CANTON FOUNDRY & MACHINE CO.
Canton, Ohio

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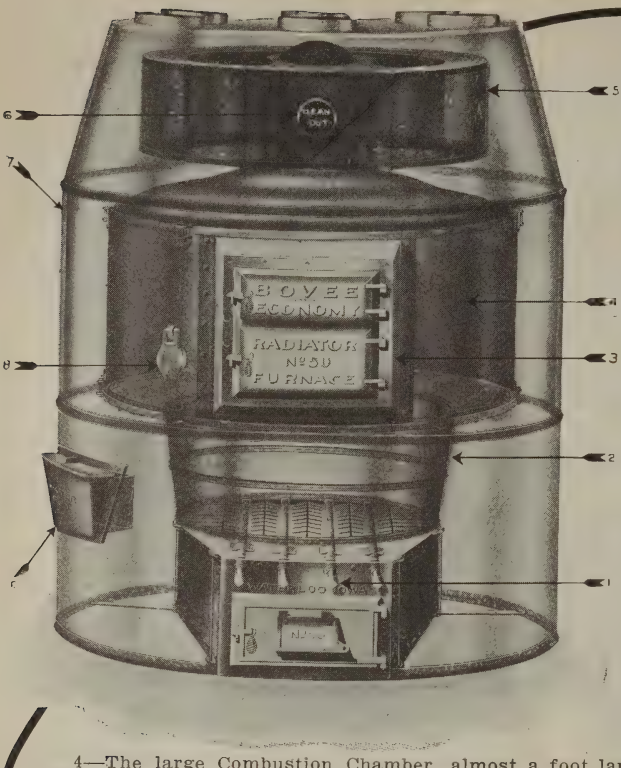


Bovee Furnaces

AT

Manufacturers' Prices

The Bovee Furnace is made of the best material and workmanship. It is in every respect a first-class, high-grade heating plant—THE BEST that can be secured at any price.

Ours Are the Only Furnaces Having a Perfect Ventilating System—

Besides the following Strong Points:

1—The independent Rocker Shaking Grates, easy to operate, never clogs with cinders and in mild weather it is only necessary to shake one or two, allowing the ashes to remain on the others, giving the same effect as a small firepot that would only hold a hod of coal. With these grates the fuel burning capacity can be regulated exactly to suit.

2—Heavy castiron Firepots, made in two sections—the most durable and largest radiating capacity in use.

3—The large Double Doors—only one or both can be opened as desired.

4—The large Combustion Chamber, almost a foot larger than the firepots. It is the **combustion chamber** that **radiates the heat** and the **firepot** that **burns the fuel,** and the larger the combustion in proportion to the firepot, the less fuel will be consumed to produce a given amount of heat.

5—The Compound Circulating Radiator—the heat enters this radiator at the center and circulates around both ways before entering the flue, giving a travel to the heat, and securing the utmost amount of heat from the fuel consumed.

6—Clean Out—This clean out opening extends through the casing and through it the circulatory radiator can be cleaned in two minutes, without stopping fire. This allows the radiating surface to be kept as clean of soot as when new.

7—Large Galvanized Iron Casing, made double and having asbestos between. With this large casing the air never becomes overheated and is balmy as June.

8—Hot Blast Ventilating System gives fresh air to every room, burns the smoke and gives a quick, healthy circulation to all the air in the building.

9—Water Evaporation Pan supplies moisture to every room in the house; an advantage that cannot be secured by a steam or hot water plant.

We make the combustion chamber, the return circulating radiator and every part of the ECONOMY FURNACE very large in comparison to the firepot. This makes them the most durable and economical of any furnace in use and causes them to supply a perfect, balmy air, similar to May or June. This very large combustion chamber, perfect combustion in burning wood, coke or any kind of coal, the long travel of the heat before reaching the chimney, causes these furnaces to actually require only about ONE-HALF OF THE FUEL USED BY OTHER FURNACES. ¶ Don't compare our prices with small, cheap furnaces that do not have one-half the capacity. Measure the firepot, measure the combustion chamber, measure the compound circulating radiator. Note the long travel of heat before reaching smoke pipe! Write us for reasons why the Bovee Furnaces LAST LONGER, USE LESS FUEL and COST LESS in comparison with other furnaces of equal size and capacity.

PLANS AND SPECIFICATIONS—Send us a rough floor plan of the building you wish to heat and our experienced experts will prepare free of charge a complete plan of your heating plant and give you our manufacturers' prices, which are but little above the actual cost of production in our own factory by the best improved methods. SHIP CUT TO FIT—EASY TO INSTALL. We ship everything prepared, and any handy man can install our furnaces perfectly. We furnish full directions and illustrations for installing.

FIVE-YEAR GUARANTEE. We use the best material and furnish a five-year guarantee. There is absolutely no risk in buying a Bovee Furnace.

Prices of Our Economy Furnaces F. O. B. Waterloo

No.	Dia. of casing	Dia. of radiator	Dia. of firepot	Heating capacity up to	Price complete with casing
40	40	28	21	five rooms	$53.00
45	45	32	23	seven rooms	58.00
50	50	34	25	nine rooms	63.00
55	54	38	29	eleven rooms	68.00

Larger furnaces at equally low Prices

You and your clients will like the BOVEE FURNACES just as well as our thousands of other customers

Send for our Free Catalog and other detailed information—TODAY

BOVEE GRINDER & FURNACE WORKS :: 60 Eighth Street WATERLOO, IOWA

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

On that Nice Job

Use a Starrett Scraper

You'll be proud of the result

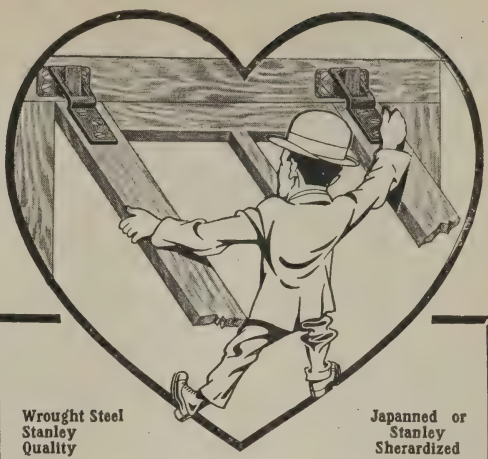
For producing beautiful smooth surfaces on all kinds of fine woodwork, there is no tool so convenient as this scraper.

In an instant you can have a new, sharp, true cutting edge by turning the handle with the ball joint connection.

You can get into corners or close up to walls without bruising your knuckles.

For sale at the nearest hardware store. Send for our Catalog No. 19M.

THE L. S. STARRETT CO.
ATHOL, MASS. 42-10



"Peerless"
Storm Sash Hangers and Fasteners

Just what you want to hang your Storm Sash correctly. Once applied no tools are needed to take down or put up the sash. Full length screens can be hung on the same hooks.

The Fasteners hold the sash firmly in place while either open or closed.

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THE STANLEY WORKS
New Britain, Conn.

BUY FROM THE MAKER

¶ **We have made and sold thousands of steel furnaces in Chicago, and we have sold them everywhere, by mail, direct to contractors, builders, and house owners, all over the country, from Maine to China. We don't offer them through dealers, for the DIRECT DEAL with the consumer is the most satisfactory to all concerned. It means BETTER SERVICE—because of the direct interest of the maker in each contract—and it means BETTER PRICES, for the middlemen's profits are cut out.**

¶ **In buying** the Hess Furnace, **you needn't have faith.** You can buy it now, on trial, and test it before January 1st, 1913. We will deliver it at your station, with all pipes and registers—freight prepaid.

¶ **Set it up and use it.** If you're not pleased; not sure you have big value for the price—send it back to us—we paying return charges—and we won't claim one cent from you.

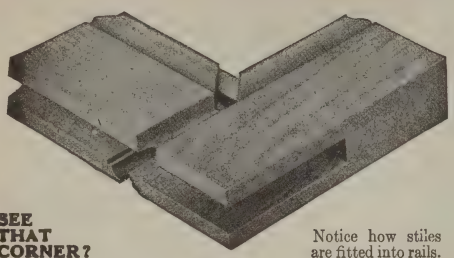
¶ **We don't offer you credit, however,** for we require the price to be deposited with your local banker when you receive the goods. He holds it till the test is made, subject to the conditions outlined above, and gives it to you or to us, according to the result of the test. You take no risk, and you will save money.

¶ **Our furnace is made of steel,** EVERY SEAM WELDED, and therefore permanently gas—dust—and smoke—tight. Made in six sizes, and burns any fuel. There is no furnace better, at any price.

¶ **Our 48 page booklet on furnace heating is free. Ask for one. It will give you a lot of useful information on heating.**

HESS WARMING AND VENTILATING CO.
907 TACOMA BUILDING, CHICAGO
WE MAKE THOSE BEAUTIFUL WHITE STEEL MEDICINE CABINETS; CHEAPER THAN WOOD

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



SEE THAT CORNER?

Notice how stiles are fitted into rails.

MADE TO ORDER

Fly Screens and Screen Doors

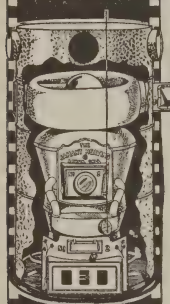
We use the best grades of wire, black enamel, galvanized, pearl and copper bronze, fastened by the improved **Standard Shoulder Strip Method,** which makes the wire drum tight and firm, can not sag or pull away.

Dealers, Carpenters, Contractors and Builders, write for a free copy of our 1912 illustrated catalog

STANDARD SCREEN CO., 1848-50 W. 14th Street Chicago, Ill.

Our screens are all mortised, tenoned, joined with waterproof glue and pinned with steel pins, will last a lifetime

Specify the Jahant Down Draft Furnace



Write for Terms and Free Furnace Handbook

OUR SERVICE DEPARTMENT

will cooperate with any Builder, Contractor or Architect who wishes to specify or install a dependable heating equipment. The **Jahant Down-Draft Furnace** solves the heating and ventilating problem for residences, schools, hotels, churches, and similar structures. Our 365 day "Guaranty Bond" given with every furnace insures absolute satisfaction. Send us details, sketches or blue prints of the building to be erected, and we will furnish without cost special plans, specifications and blue prints of a

JAHANT DOWN-DRAFT FURNACE

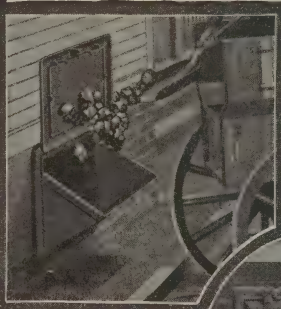
guaranteed to furnish plenty of heat at a minimum cost for fuel. If you include the Jahant in your finished plans we will pay freight on the complete shipment of furnace, pipes, registers, all fittings and the necessary tools.

Write for our free Specification Hand Book. It tells more about the Jahant and our co-operative plan.

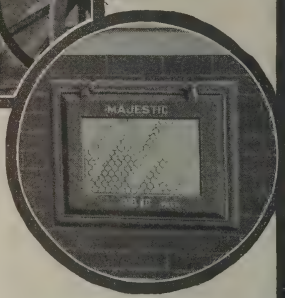
THE JAHANT HEATING CO.
90 Mills St., AKRON, OHIO

Furnace Builders for over 30 Yrs.

MAJESTIC FOUNDATION COAL CHUTE



¶ Protects the building just where most needed—above the opening. ¶ The heavy steel hopper catches all the coal.



¶ When not in use, the hopper lies in the bottom of the chute body. ¶ The door locks automatically either open or closed. Strictly burglar-proof. ¶ With ¼ inch wire glass or steel panel in door.

Write for circular and address of nearest dealer

Majestic Furnace Co.
70-74 Erie Street Huntington, Indiana
Chicago Office: 1102 Monadnock Block

KOLL'S PATENT

Lock Joint Columns

Hot Off the Press

Our trade bulletin No. 1 containing valuable information for the Architect, Woodworker and Builder. All the information you need regarding wood columns. This is free for the asking.

THEY CANNOT COME APART

HARTMANN-SANDERS COMPANY

Main Office and Factory, 2155 ELSTON AVENUE, CHICAGO
Eastern Office, 1123 BROADWAY, NEW YORK CITY

NAT. BUILDER

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Recessed Steel Medicine Cabinet

MEDICINE
HESS SANITARY LOCKER
CABINET

The Only Modern, Sanitary, STEEL Medicine Cabinet

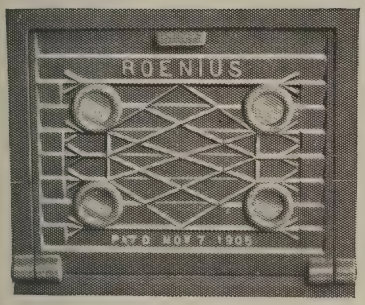
or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves. Costs Less Than Wood.

Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned. Should Be in Every Bath Room. Four styles—four sizes. To recess in wall or to hang outside. Send for illustrated circular.

HESS, 907 L Tacoma Bldg., CHICAGO

Makers of Steel Furnaces. *Free Booklet.*

The Outside Steel Cabinet

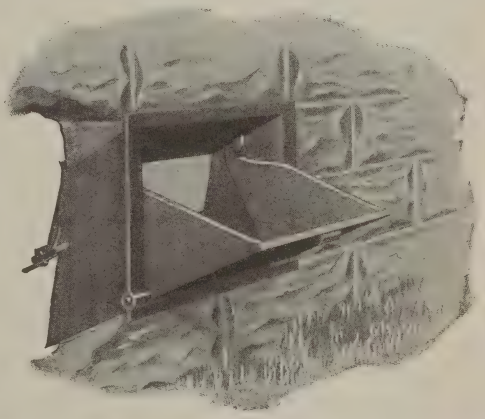


Roenius Wood and Coal CHUTES

Have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed.

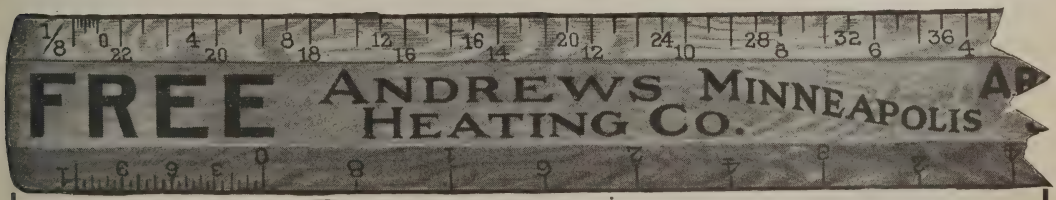
Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked.

Roenius style B Chutes are made with glass discs—and this chute is used especially in cases where the only available light must pass through the coal chute.



Ask your dealer for the Roenius—and get the best.
Write for Circulars and Prices.

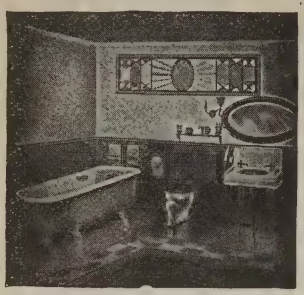
GRAND RAPIDS FOUNDRY COMPANY
MANUFACTURERS
Grand Rapids, WISCONSIN



Architect's Scale SEND US TWO OR MORE NAMES of persons who are interested in or want to buy Hot Water Heating Plants and we will send you this scale. Back inches are divided into 6, 10, 12, 16, 20 and 40 parts. Also free catalog on request. Name this paper when writing.

ANDREWS HEATING CO., 1287 HEATING BUILDING MINNEAPOLIS, MINN.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Full Line of Plumbing Supplies

Sold Direct at Wholesale Prices

20 to 40 per cent Saving

Complete bathroom outfits—tubs, closets, lavatories, kitchen sinks, etc. Prompt shipment from a complete stock. The only house selling up-to-date, guaranteed goods at wholesale direct. Write for illustrated catalogue and prices.

B. Y. KAROL, 768-72 W. Harrison St., Chicago, Ill.

Investigate Before You Buy

and you will find we can save you lots of money on anything in the line of HIGH-GRADE sash, doors, frames, blinds, mouldings, inside trim, grilles, colonnades, stair and porch work, mantels, grates, tiling, art glass, paints, roofing and building papers, wall boards, hardware, hardwood and parquetry flooring, rolling partitions, screens, steel ceilings, gutters, shingles, etc.

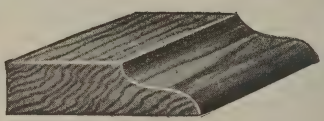
WINDOWS
42c and up

Our new catalog mailed free will convince.

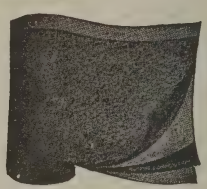
Prompt shipments and materials all first-class.

Let us send you our SPECIAL FIREPLACE CATALOG—showing unusual values.

The Huber Builders Material Co.
39-43 Vine Street CINCINNATI, OHIO



WINDOW BEAD
Best Yellow Pine
27c per 100 lineal feet

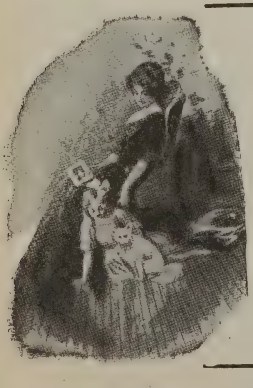


ROOFINGS
64c and up

STAIR NEWELS
$1.50 and up

HARDWOOD MANTELS
$3.58 and up

PORCH NEWELS
42c and up



OAK FLOORING

Increases the Renting and Selling Values and Attracts a Better Class of Tenants

Builders and **owners** will find it a clinching argument to say, "It's floored with OAK FLOORING." It imparts an air of **refinement** and **elegance. It is the modern flooring.**

OAK FLOORING ⅜″ thickness by 1½″ or 2″ face can be laid **over old floors** in old homes or over cheap sub-floors in new homes **at a very low cost.** it is **cheaper than carpets** or **pine flooring.** When laid it has all the appearance of heavy flooring.

There is a **solid satisfaction** and **lasting pleasure** in the **substantial** and **dignified appearance** of OAK FLOORING.

Contractors and carpenters find it very profitable to lay ⅜″ stock over old floors in old homes during dull periods. A little **canvassing** is all that is necessary to **secure** jobs.

For **durability** OAK is the **best.** OAK FLOORING laid thirty years ago, after very hard use, is still in good condition. ¶ **WRITE FOR BOOKLET.**

THE OAK FLOORING BUREAU, 897 Hammond Building, Detroit, Michigan

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THAT YOU WRITE ADVERTISERS.
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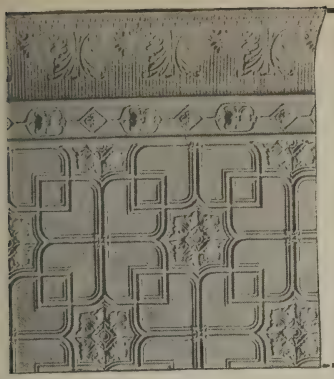
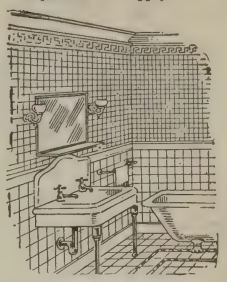


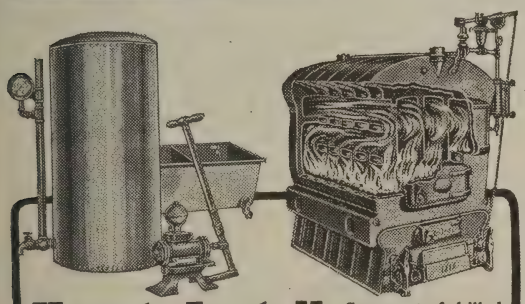
METAL CEILING

Something exceptional—out of the ordinary class—and as plain or elaborate as you like. Patterns especially adapted for residence work. Nothing better for a new house or to repair an old one. Catalog.

NORTHROP, COBURN & DODGE CO.
30 Cherry Street, :: NEW YORK

METAL TILING
For the Kitchen and Bathroom
Carpenters Can Apply It





How to Install Modern Heating Plant in Your Home

Save cost of skilled labor. Save on all material. Post yourself on the new method. The practical Gibbons method. My book explains how you can install hot and cold running water, bathroom outfit, **a modern heating plant,** also electric or acetylene lighting plant, at an amazingly small cost. Send for this valuable book.

BOOK FREE

My new book gives you greater buying power than your local dealer. It is the most valuable catalog for you ever issued. Thousands of things illustrated and priced. **Hot water and steam heating plants,** gasoline engines, hydraulic rams, pipes, pumps, valves, electric lighting plants, acetylene lighting plants, all accessories. Everything guaranteed, high quality at direct, **rock bottom prices** to you. You certainly ought to have this valuable book. Just ask for Gibbons' book.

Write Today See for yourself how easy it is to make improvements about your home with the aid of my new book. The low prices of my high quality material will astound you. Home owners, contractors, builders, need my wonderful new book. Write today. Just send your name. It is post-paid free to you.

M. J. GIBBONS, Dept. 2421, Dayton, O.

This is a new Designed Porcelain Enameled Roll Rimmed Sink,

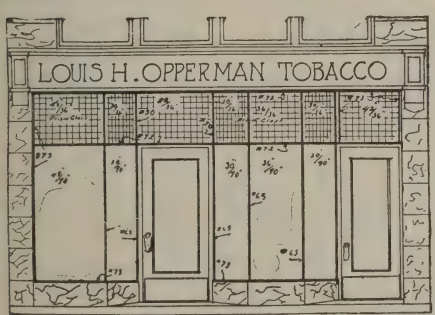
$16.85 For This $28 Outfit

having Back and Drain Board all in one piece—Wall Hanger, Adjustable Legs, Concealed Galvanized Air Chambers, Nickel-plated Strainer, Fuller Adjustable Flanged Bibbs and "P" Trap, with waste to wall. Sink is 20 x 30 inches, with 20 x 24 inch counter, sink drain brass; 12 inch back extending over sink, and runboard all in one piece. **This low price of $16.85 includes two $1.50 Faucets, and the large 1½ inch Trap. Send in your order now—you will find this a good BUY.**

WRITE FOR OUR FREE CATALOG TOO

It shows a splendid line of modern Bathroom Outfits, from $38.95 to $175.00, Water Pressure Systems, Hot Water and Steam Plants, and an endless assortment of pipe, valves, fittings, etc. Everything high class and strictly guaranteed. **Sold direct to you at lowest prices.**

JOHN HARDIN COMPANY
25 years at the same address
4541-4549 Cottage Grove Ave. Chicago, Ill.



FRONT ELEVATION

Everybody Is Satisfied

when Petz Bars are specified for that modern store front.

The owner is pleased because the appearance is beautiful, his window display is perfect and well lighted, and the ventilation is all that can be wished for.

The architect and builders are pleased because **Petz Bars are staunch and strong, easy to install, and were never known to break glass.**

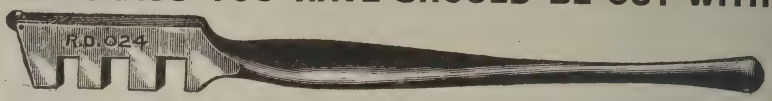
You will be pleased to get our valuable booklet on "Metal Store Front Construction." A copy is waiting to send at your request.

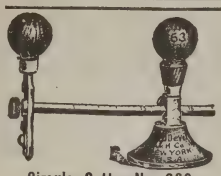
DETROIT SHOW CASE CO.
SOLE MAKERS
481 FORT STREET WEST, - DETROIT, MICHIGAN

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE NEXT JOB OF GLASS YOU HAVE SHOULD BE CUT WITH

"RED DEVIL" GLASS CUTTERS





Circular Cutter No. 263

"Red Devil" Glass Cutters are the standard of the world. Experienced Glaziers use them in preference to all others. A sample of No. 024, shown above, will be sent you postpaid for three 2c stamps. We want you to send for a sample today.

Cut your own Circular window panes with this **"RED DEVIL" CIRCULAR CUTTER No. 263.** Cuts from 2" to 22" circles or curves in ANY kind of glass. Can be used as a straight line cutter too. A sample with two EXTRA wheels will be sent postpaid for $1.25.

SMITH & HEMENWAY CO., 154 Chambers Street, New York

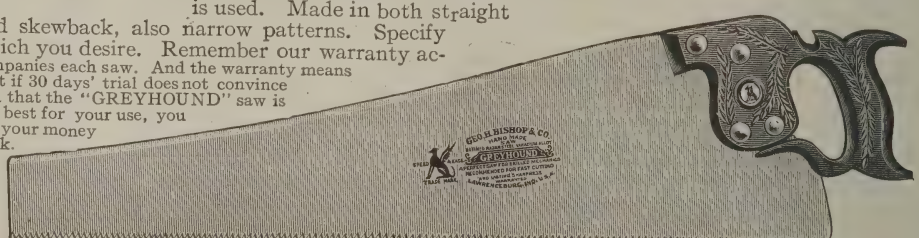
(We make over 3000 styles of RED DEVIL Tools. Hardware stores everywhere sell them.)

Greyhound Hand Saws

TRADE MARK.

The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. ***This saw will be imitated by others—but not equalled.***

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the best for your use, you get your money back.

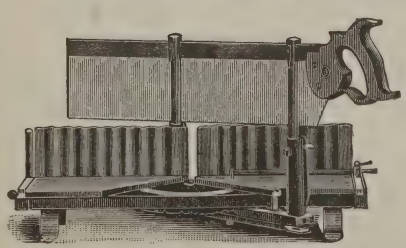


Inches,	18	20	22	24	26	28	30	Net.	Packed one in a Box
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		

Order one today and let us take all the risk. If you want literature first, write us

GEO. H. BISHOP & CO., Makers, Lawrenceburg, Indiana

GOODELL MITRE BOX



MADE OF STEEL—CANNOT BREAK

First in Quality and Improvements

Automatic stops for holding up saw. Corrugated Backs. Graduated. Gauge for duplicate cuts and many other features. If you want the best you will take no other.

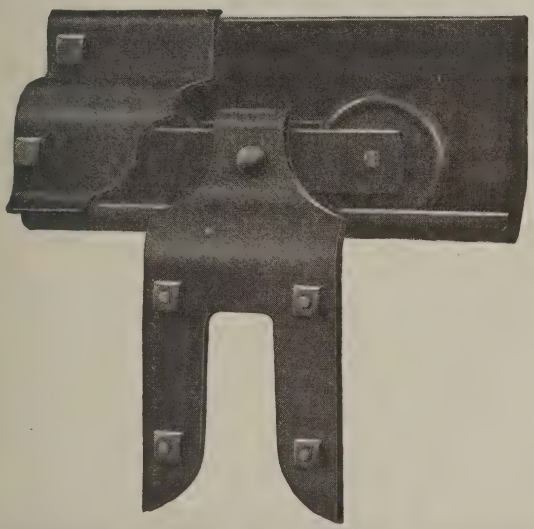
SEND FOR CIRCULAR E

GOODELL MFG. CO. GREENFIELD, MASS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

WE INITIATE—NEVER IMITATE

Storm-Proof Hanger



Distinctive Features

Easy running.

Anti-Friction steel-roller bearings.

Frictionless contact with rail.

Great strength and durability.

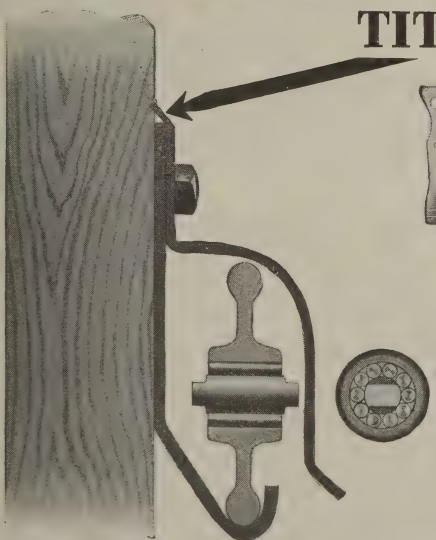
Illustrated directions packed with each pair.

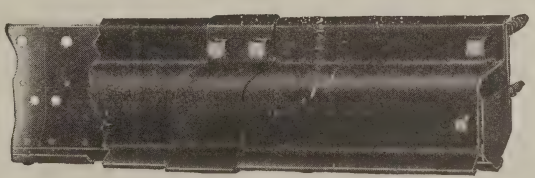
The cut shows the No. 66 Rigid style.

The No. 77 has a flexible Hinge Joint.

STORM-PROOF RAIL

TITE-FIT





Requires no brackets.

Forms a continuous bracket in itself.

Requires no housing. Fits close against the building. (See sectional view.)

Perfect tread for hanger wheels. Bird- and Storm-proof.

A detailed description will be found in our general catalog, a copy of which will be gladly mailed on request.

NATIONAL MFG. COMPANY

STERLING, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Meets the Modern Demand

A Strong and Permanent Bond is formed by Concrete or Plaster when applied to

RIB-TRUS Reinforcing Plate

in construction of roofs, floors, walls, partitions and ceilings

With RIB-TRUS no bolts or nuts are necessary. It is fastened to the purlins from above by special clips, enabling quicker and easier erection, the ribs acting as beams and making an extremely stiff plate.

It has the greatest sectional per gauge of any plate, therefore the greatest tensile strength.

Get in touch with our nearest Berger Branch today for our RIB-TRUS booklet.

The Berger Mfg. Co., Canton, Ohio

For the Best Service address nearest branch

NEW YORK ST. LOUIS BOSTON MINNEAPOLIS PHILADELPHIA SAN FRANCISCO

Also Manufacturers of Metal Lumber, Prong Lock Studs and Furring, Ferro-Lithic and Multiplex Reinforcing Plates, Metal Ceilings, Expanded Metal Lath, Sidewalk Forms, Raydiant Sidewalk Lights, Etc.

TWO MINUTE LOCK MORTISER

Not an experiment but a practical labor and time saving tool.

Thousands of builders have verified our claims. No lost motion, but every stroke of the lever counts. We don't want your money unless it does the work.

Riverside, Calif. A. W. MILLER MFG. CO. Cincinnati, O.

Our Butt Mortiser and Rule Gauge for 75 cents.

The Typewriter as a Perpetual Investment to the Architect and Contractor

Fox Model No. 24

The typewriter has made possible the enormous business development of this country.

Fox typewriters can be made a perpetual investment to any Architect or Contractor and if persistently used will double the business of the average man in six months' time. **Read how:**

We will sell you our latest Fox Visible Typewriter, Model No. 24, for a few dollars down, if time is wanted, and the balance $5.00 monthly. Make a list of prospective builders in your vicinity. To each of these write frequent, but short, personal letters. Call attention to some particular building you have just designed or erected and ask the party to inspect it. Show the advisability of building at this particular time—materials are lower—help more easily secured—weather conditions favorable. Don't overlook the fact that the big mail order houses of the cities are hard after the small home builder—and they'll get his order, too, unless you adopt their progressive methods by starting a personal letter mail campaign.

This is too big a subject to handle in an advertisement, but it is too important to be neglected by you. Write us today for full particulars, catalog, etc. **Now, before you forget it.**

Fox Typewriter Company

4410-4710 Front Ave., Grand Rapids, Mich.

The National Builder Enquiry Coupon

Name _____

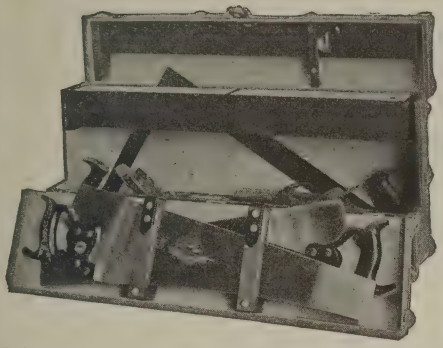
Address _____

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Don't Lug a Heavy Tool Box Around But

CARRY YOUR TOOLS IN THE INDESTRUCTO

CARPENTERS' TOOL CASE



It is made in suitcase style—of three-ply veneer, covered with strong canvas and painted, all edges bound in steel, reinforced corners, secure locks and catches and strong handle. The Indestructo is the handsomest tool case manufactured. It is light, very strong, and the inside is so well arranged with separate compartments for saws, planes, level, square, chisels, bits, etc., that the cutting edges cannot be injured. Tools can be quickly found and put away. It is made in two lengths, for 26 and 28 inch saws. Special sizes to order. Send for prices.

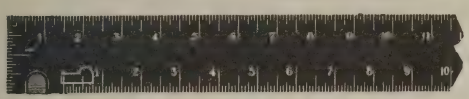
WEDELL & BOERS

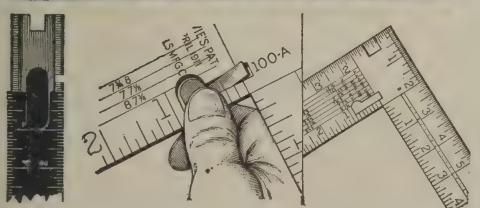
Sole Manufacturers

157 Jefferson Ave, Detroit, Mich.

Nicholls Take-Down Square—

It has a Thumb Lock. No Key to Lose.
GUARANTEED TO REMAIN TRUE





Beveled Bearings take up wear in taking square apart and putting it together, therefore it will remain true. Rust-proof canvas case with each square.
If your dealer does not handle our goods and will not order them for you, write us. We have a special inducement to those who order first square in every town. We prepay express.

THE No. 100A HAS THE OCTAGON FRAMING RULE ON BACK

	Polish	Ox. Copper	N. Plated on Copper
No. 3 Standard	$2.50	$2.75	$3.00
No. 100 Standard	2.75	3.00	3.25
No. 100R Framing	3.00	3.25	3.50
No. 100A Framing	3.25	3.50	3.75

Add ten cents to the price of the No. 100R and 100A if 1¾ inch tongue is desired.

NICHOLLS MFG. CO., Ottumwa, Iowa

Another New "Yankee" Rigid Driver No. 90

14 Sizes

A strong, durable, and well-balanced tool, of the same high quality as other "Yankee" Tools, which today are without equal. The blade and ferrule are highly polished, the handle of hardwood, finished in dull black, making a handsome appearance. Each tool is thoroughly tested, and the blades are positively guaranteed not to turn in handle.

SEND FOR BOOK OF LABOR SAVERS

North Bros. Mfg. Co.

Dept. N

Philadelphia, Pa.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Specify Electric Lights in the Home You Build

Everybody can now have electric lights.

The Gray Complete Automatic Light Outfit solves the lighting problem for the farmer or anybody living where electric lights are not available.

Power for your Shop

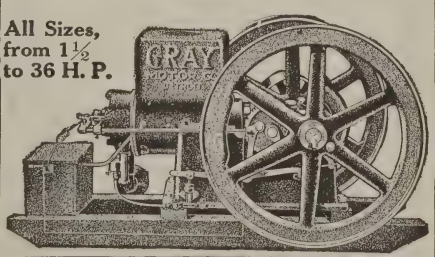
The ideal gas engine for the contractor and builder's shop is the 4 H. P. Gray.

It's just the right size to install in your shop and run all your woodworking machinery—also makes an excellent portable outfit to take out on the job.

Of course we have all other sizes from 1½ to 36 H. P. and are prepared to supply your requirements whatever the need may be.

You might also be interested in one of our Lighting Systems for your own building — you could have a nice light shop—a finely lighted home and the current would cost practically nothing.

All Sizes, from 1½ to 36 H. P.



Contractors and builders can make a nice profit by specifying and selling the outfit to be installed in new buildings.

It is an exceptionally simple system that is easy to install and a system that anybody can understand and operate.

You know that electric lights are best—far superior in every way to kerosene or gas, and with this new Gray system the current for electric lights is much less than the cost of artificial or natural gas.

The cost of the outfits is well within the means of the average man.

Built in 4 sizes suitable for farms and country homes, churches, lodge rooms, club houses, small shops and factories.

Outfit consists of Gray stationary Engine, Dynamo, Storage Battery and switchboard.

The engine can also be used for other work. When doing other jobs it can also be operating the dynamo and storing up current for future use.

In this manner the outfit is furnishing current for lighting at practically no cost whatever.

If interested in taking up this Electric Lighting proposition in your locality write and ask for special proposition to contractors and builders and get copy of Electric Light Catalog No. 5, or if interested in engine only ask for Engine Book "S".

GRAY MOTOR CO., 1081 U. S. Motors Bldg., Detroit, Mich.

NAT BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BUFFALO
WIRE WORKS CO.

FORMERLY

Scheeler's Sons

Manufacturers of

WIRE CLOTH

Crimped Wire Concrete Reinforcement, Plain and Galvanized, in all size meshes and Gauges of Wire.

WIRE WORK

Plain and Galvanized Wire Lathing, also Grimm's Galvanized Corrugated Wire Lathing.

Buffalo Wire Fencing.

ARTISTIC METAL WORK

AGENTS FOR

Clinton Electric Welded Fabric

Samples and Prices Upon Application

SEND FOR OUR No. 5 CATALOG.

442 TERRACE

BUFFALO, N. Y.

My Boy! Here's Your Chance

It's more than a chance—you can make it a certainty because it depends entirely upon yourself. It's your opportunity to rise to one of the countless positions open to the trained man and obtain a trained man's salary.

The man who sits in his private office and "hires and fires" and lays out your work, was no more qualified to fill that position a few years ago than you are today. He saw **his chance** and made the most of it. He obtained his training and knowledge by study. You can do the same—the American School will help you.

You don't want to remain in the "time-clock and dinner-pail" class all your life—don't be satisfied with just a common job at small pay. Show the boys at the shop that you have it in you to advance—you owe it to yourself and to your family.

Don't be afraid to mail the coupon, you won't be bothered by agents or collectors. Like all strictly educational institutions the American School depends, for growth, upon reputation and the success of its students.

Don't let a little thing like filling in and mailing a coupon stand between you and success, congenial work and more pay. **Accept your chance to-day.**

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American School of Correspondence

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This is your Opportunity

Check the course you want and mail the coupon now

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Please send me your Bulletin and advise me how I can qualify for the position marked "X." Natl. Bldr. 10-12

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.....Civil Engineer	.....Stenographer
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.....Elec. Light & Power Supt.	.....Cost Accountant
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NAME .....

ADDRESS .....

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DUMB WAITERS

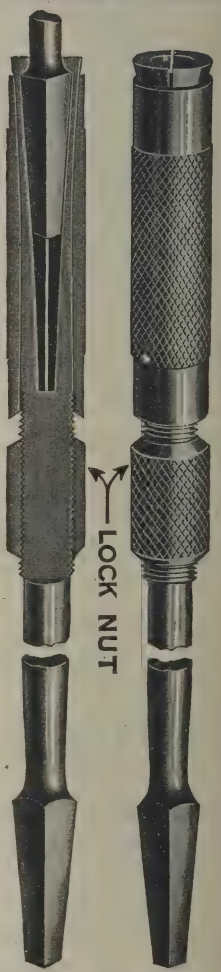
The best is the best and the cheapest is not always the cheapest. Builders who have used the most dumb waiters and hand power elevators agree that those made by the Sedgwick Machine Works are the best, and if results are considered, that they are the most profitable to handle. Some builders buy the Sedgwick Machines only and build the balance of the outfit themselves. Others find that it is more convenient to let the Sedgwick Machine Works supply the complete outfit, as it is manifestly impossible to make one dumb waiter as cheaply as they can be made a hundred or a thousand at a time.

Send at once to the Sedgwick Machine Works, 130 Liberty Street, New York, for their Catalogue "K" which will be mailed you free, and you will then have for reference a catalogue from which you can select just what will best suit your requirements.

Stanley Tools

Stanley Extension Bit Holder

No. 1



The Stanley Extension Bit Holder will be found to be a very useful tool for Electricians and Plumbers as well as Carpenters.

Used in connection with a Bit Brace it will extend the Bit, enabling the user to bore through walls, floors, etc., where the ordinary Bit will not reach.

The Socket in which the Bit rests and the Shank for its entire length are of one piece of steel.

Note how the shape of the Socket conforms to the Shank of the Bit. This form of construction together with the improved Lock Nut makes it impossible for the Bit to work loose while boring.

Any length Holder will follow up a 5/8 inch Bit. Heavily nickel plated and highly polished. Made in six different lengths.

Length	12 in.	16 in.	18 in.	20 in.	24 in.	30 in
List Each	$1.15	$1.15	$1.25	$1.25	$1.45	$1.70

Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.

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We Save Home Builders 30% to 50%

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Compare our offers and you will be satisfied that none can compete with our price *—and none can equal our service.*

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A truly wonderful book given away Free. One hundred pages of modern, up-to-date designs. Free to all parts of the United States. Other points upon receipt of 25c.

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The object of this advertisement is not to sell plans, but if you are interested in any of the designs shown on this page, we will, to save time, send a complete set of Plans. Specifications and full descriptive Material List, showing sizes, style, quality and catalog number of the material that we furnish. The best part of it is, that the entire $2 will be credited on your order, or if plans do not suit, you may return them and all but 50c will be refunded. In addition, we will also name, upon request, delivered prices for complete Plumbing Outfit and Heating Plant of any kind and furnish complete specifications free of charge.

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Send for our Special Building Material Catalog No. 100, Plumbing Catalog No. 133 and Heating Catalog No. 120 showing a complete line of construction of house, barn, or any other building. The newest and latest features in each line at low prices.

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Design No. 53
$960 Seven Rooms, Bath, Large Living and Main Bedroom, Modern in every respect. Size 27 x 36 ft.

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Write for our prices on our complete bathroom outfit. We guarantee a saving of 30% to 50%.

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Steam, Hot Water and Warm Air. Let us estimate on rour requirements. Big saving.

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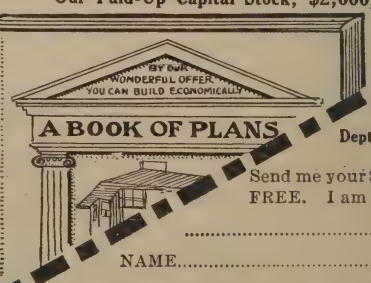

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Quality Tells

There is something in the appearance of a well-made, high-grade tool which carries to the mind an undefinable feeling of real value —a sense of efficiency and creates a desire for possession.

The demand for the DISSTON BRAND Saws, Tools and Files has been steadily increasing since 1840.

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INCORPORATED
Keystone Saw, Tool, Steel & File Works
PHILADELPHIA

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Schroeder Flooring Factory at Milwaukee

The home of America's Finest Hardwood Flooring

THERE is **one** brand of hardwood flooring which always matches easily and accurately—**one** brand which **never** shrinks! It's the product of America's finest flooring factory—

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Hardwood Flooring (Maple, Beech Birch & Oak)

A new, handsomely-illustrated booklet—which we send free on request—tells you how "Steel-Polished Perfection" is made and why it is better.

It shows interesting views of the wonderful Schroeder plant—also fine four-color plates of "Steel-Polished Perfection" laid with ornamental borders—and explains in detail the exclusive Schroeder Double-Drying Process which makes "Steel-Polished Perfection" **absolutely shrink-proof.**

Get This Valuable Book Free—And Send Us Your Lumber Bills for Estimate

SEND today for this interesting booklet—and ask us about our facilities for shipping lumber in carload lots direct to contractors from our own Northern, Southern and Western Mills.

John Schroeder Lumber Company

Foot of Pleasant St., Milwaukee, Wis.

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THE NATIONAL BVILDER

for NOVEMBER, 1912

for Working Plans *and* Estimates of these Bungalows *see* Supplement *and* Pages 35 *to* 38

3TH YEAR

BLISHED BY
RTER-HODGSON CO.

PRICE 15 CENTS

Two Styles But Only One Quality

Russell Jennings Auger Bits

are made with two styles of shanks: The ordinary kind for use in the ordinary bit brace and the new Precision turned shank for those men who are annoyed by having the ordinary bit shank pull out of the brace. But the quality is the same for both kinds. It is the well-known Russell Jennings quality. Experienced carpenters know that this means the best in bits—fast boring, clean cutting, non-clogging. When you want auger bits, remember the name Russell Jennings, then ask your dealer to show you them.

Russell Jennings Mfg. Co.

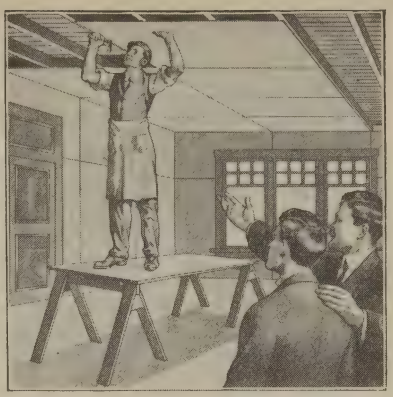
Chester, Conn.

21-98

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Chop Off Half Plastering Cost —Get Better Walls and Ceilings

and Build Right Through the Winter



Walls and ceilings made of Bishopric Wall Board cost half as much to apply as lath and plaster. These walls are durable, artistic, sanitary. They give lasting satisfaction.

You can have artistic interiors of this material without the dampness, dirt or delay of the old plastering method, and save money. Walls and ceilings of Bishopric Wall Board last as long as the building.

Save a Month's Time

You save a month's time on your building job when Bishopric Wall Board is used. Comes in sheets ready for use. Nail the sheets to studs, and walls and ceilings are ready at once for paint, paper, kalsomine, burlap or any other decoration.

Anyone who can drive nails can apply Bishopric Wall Board. Goes on dry. No waiting for plasterers. Any carpenter can apply this Wall Board quickly, and have a room ready for decorators the same day.

For New Buildings

Bishopric Wall Board is superseding lath and plaster for interior finishing of fine homes, bungalows, schools, churches, hospitals, public halls, stores and every sort of building.

Contractors, carpenters and home builders are now using more than a million feet a month of this wonderful ready-made material. Gives a smooth, hard surface that lends itself to every form of artistic decoration.

For Remodeling

Carpenters who use Bishopric Wall Board can finish their interior jobs without the aid of lathers and plasterers. You can leave walls and ceilings ready for decorators and put the plasterer's profit in your pocket.

Ideal for building partitions, or for turning waste attic or basement space into splendid, usable rooms. Users everywhere are delighted with the beauty, economy and durability of Bishhopric walls and ceilings.

BISHOPRIC WALL BOARD AND SHEATHING

$5,000 Anti-Warp Bond

Bishopric Wall Board will not warp, crack, buckle or pull loose. Stays stiff winter and summer in any climate. Is a non-conductor of heat and cold It acts as a fire-retardant, is sound-proof and sanitary.

This claim is backed by a $5,000 Anti-Warp bond. Every purchaser is protected by this bond.

Bishopric Wall Board is the only reinforced ready-to-use material for walls and ceilings. Kiln-dried dressed lath are pressed into hot Asphalt Mastic under terrific pressure. The lath keep Bishopric Wall Board stiff. The Asphalt-Mastic is a toughened, non-burnable material. On this body is pressed a surface of heavy, sized fibre-board which gives the smooth, hard surface.

Costs Less to Apply

Bishopric Wall Board costs 50 per cent less to apply than lath and plaster. Comes in 4 ft. x 4 ft. sheets. Price $2.50 for 100 sq. ft; $6.40 for crate of 16 sheets, 256 sq. ft.

Book, Sample and House Plan Free.

Send for Bishopric book with illustrations of interior work in colors, big sample of Wall Board, complete Blue Print Plans of Model House, duplicate of $5,000 Anti-Warp Bond, letters from users, etc. Will give you new ideas for better interior work on all kinds of buildings. Enclose 6c in stamps for packing and mailing.

FREE SAMPLE

DEALERS!
Write for Great Exclusive Agency Proposition

The Mastic Wall Board and Roofing Mfg. Co.

334 Este Ave., Cincinnati, Ohio

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The "ABC" of BEAVER BOARD Construction

The eleventh of a series of twelve monthly talks to carpenters about the practical use of Beaver Board, the pure-wood-fibre wall and ceiling material that is durable, economical, artistic; has none of the disadvantages of lath, plaster and wall-paper; and is appropriate to any type of building new or old.*

Beaver Board is essentially a proposition for Carpenters and Builders.

CHAPTER XI

Stenciling Beaver Board

"Stencil your Beaver Board walls and ceilings". There's a suggestion that you can profitably make to your clients.

They can purchase inexpensive stock designs or, better still, they may have original stencils cut to suit their individual tastes.

The possibilities of the stencil in conjunction with Beaver Board are practically limitless.

You have a golden opportunity to be of genuine assistance to your man by suggesting this inexpensive and exceedingly decorative solution of the wall problem.

*This series began in the January issue. If you haven't seen the earlier chapters, write us and we'll send them to you.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Original and Striking Effects Possible with Stenciled Beaver Board.

Stencils are used effectively for frieze designs, border of panels, center decoration of wall or ceilings, either with or without border, as preferred.

Such conventional treatments as fruits, flowers, plants, geometric designs, trade-marks, monograms, coats-of-arms, etc., are easily obtained.

Also a subject appropriate to the individual tastes or to the business of your client invariably makes a hit. Thus a cigar store may have a stenciled design of tobacco plants; a florist's shop or a restaurant suggest a dozen subjects typical of the trade, that can be used with attractive results. In the residence, a centered initial or symbolical design is always in good taste.

In short, wherever Beaver Board is the wall-covering there is an unequalled opportunity for attractive and exclusive stenciled designs—whether the job be an office, a show room, a mansion, or a bungalow.

Write for **"Beaver Board and its Uses"**, if you want to have laid before you the entire possibilities of Beaver Board. Every Master Carpenter can turn the information given in this book into actual dividends. Sent free on request.

BEAVER BOARD

BEAVER BOARD PURE WOOD FIBRE

TRADE MARK

GENUINE BEAVER BOARD has our registered trade-mark on the back of each panel and sample. It has also a light cream color all the way through, that comes only by the use of sanitary, durable **PURE-WOOD-FIBRE.** Insist on seeing both trade-mark and color before buying.

THE BEAVER COMPANIES

Address all correspondence to

United States: 453 Beaver Road, Buffalo, N. Y.
Canada: 393 Wall Street, Beaverdale, Ottawa, Ont.
Great Britain: 4 Southampton Row, Russell Square, London.

You can see how effectively stencil treatment applies to a Beaver Board Frieze from this glimpse into Mr. Roy Hammond's dining room at Santa Cruz, California.

The Beaver Board Walls and Ceilings of The U. S. Music Store at Chicago have attracted great attention. Many equally impressive designs can easily be worked out by any one.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Here's the Secret of Your Best Success

Make a reputation for yourself by using and recommending good paint. What will count for you is permanent colors, long wear and good protection from the elements—

Lowe Brothers
High Standard
Liquid Paint

"The Paint of Performance"

It's the best paint we know how to make—and we've been making and testing "High Standard" paints for forty years.

For the Interiors specify

Mellotone

the modern wall finish, washable and fadeless. Benefit by the absolute satisfaction it will give your customers.

Write for Free Booklets and color cards of these and other High Standard products. There's a Lowe Brothers' Paint, Varnish, Enamel or Stain for every purpose.

THE LOWE BROTHERS COMPANY

473 East Third Street
Dayton, Ohio

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New York
Chicago
Kansas City

Lowe Brothers, Limited
Toronto, Canada

Builders Who Know This Modern Wall Lining Use No Other

M. Barry & Son, of Chicago, Ill., write: "Compo-Board is the best of its kind we have ever used. It is cheaper, cleaner and more easily put on than any material we know of." So say hundreds of others who know from experience. For instance: N. A. Beck, a contractor in Burlington, Iowa, won the everlasting gratitude of a customer by using Compo-Board directly over a plaster ceiling that had begun to crack and fall off in spots. Thos. S. Whitbank, a real estate broker in Philadelphia, uses thousands of feet in remodeling houses. Woodruff Mfg. Co. of Washington, D. C., use many thousand feet in government contracts.

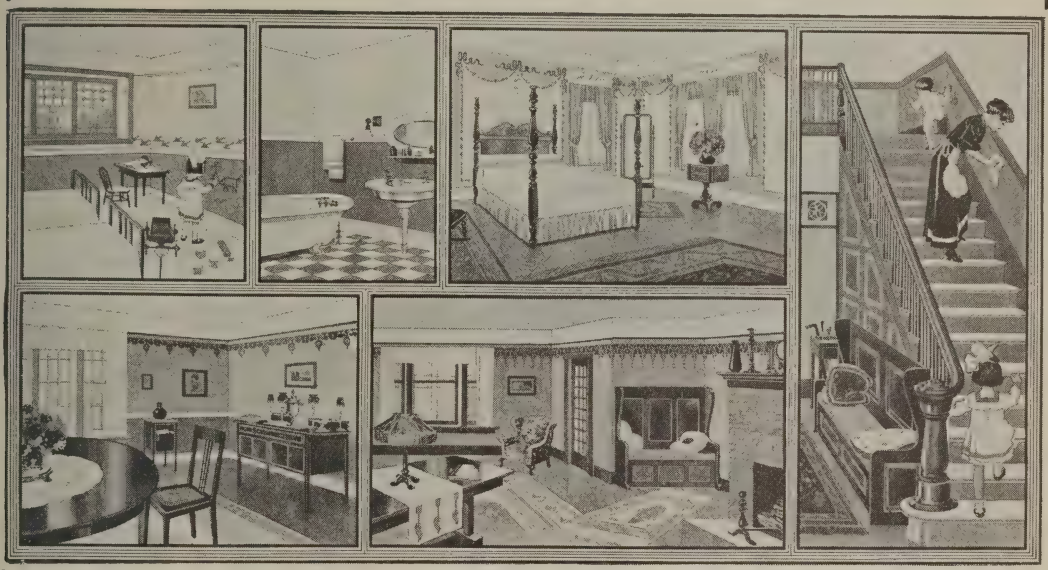
The exclusive features of Compo-Board make it the most satisfactory wall lining. The basis of its construction is a wooden slat, arranged so the grain of the wood runs in different directions, making it non-warpable. It is non-porous and airtight—hence, impervious to cold, heat, moisture and vermin. Can be papered, painted or kalsomined more satisfactorily than plaster, with or without panels. Write for sample and interesting booklet containing many money-making hints for contractors, builders, architects and home owners.

Northwestern Compo-Board Co.
5776 Lyndale Ave. No., Minneapolis, Minn.

Compo-Board

NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Every Architect, Builder and Contractor Should Get Posted on This Successful Interior Decorating Combination



Alabastine

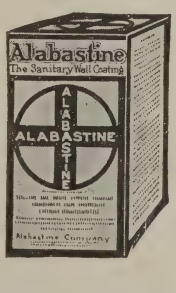
The Beautiful Wall Tint

In dry powder, ready to mix with cold water, applied with a regular 7 or 8-inch wall brush; packed in full 5-lb. packages, in white, tints and colors—also in bulk for large jobs.

Alabastine may be easily washed, if desired, from any surface to which it has been applied.

Alabastine, after being mixed, will remain in working condition for days, does not harden nor set in the bucket.

Full 5-lb. packages; white, 50c regular tints, 55c. Also in bulk for large jobs—Hotels, Offices, Schools and Public Buildings.

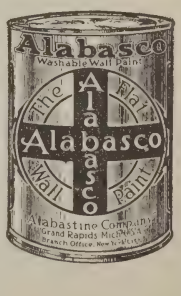


Alabasco

The Flat Wall Paint

Alabasco is the highest grade interior flat wall paint produced. It is washable and absolutely dependable. For homes we recommend the use of Alabasco in connection with Alabastine. At a little extra cost Alabasco can be used in places exposed to finger marks—along the stairs, nursery, lower part of bathroom and dining room, also kitchen and cupboards. These exposed places can be washed with soap and water.

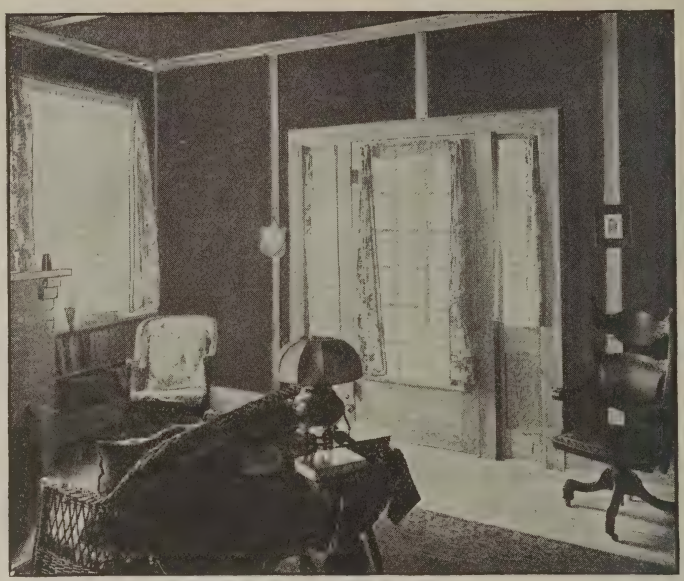
Alabasco comes in the same velvet-like water color tints as Alabastine. Is exquisitely soft and artistic on the walls, and, properly applied, does not chip, peel or rub off. Comes in liquid form ready for use.



Send For New Samples

The Alabastine Co., 739 N. B. Grandville Road, Grand Rapids, Mich.
Desk 39 N. B. 105 Water Street, New York City, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



In building a new house—
In repairing an old house—
You'll find beauty, convenience and economy combined in

UTILITY WALL BOARD

Put it right on over the studding. Do away with all the muss and dirt and uncertainty of lath and plaster—and you'll have walls and ceilings that will not crack or warp and that will last as long as the house stands.

Utility Wall Board is wonderfully convenient for making changes in an old house. You can turn a bare attic or basement into an attractive room—you can put in partitions or build closets at trifling expense—and you can do it all without any of the muss and dirt of lath and plaster. Utility Wall Board comes in sheets of convenient sizes up to 4 feet wide by 16 feet long. It is easily cut and is nailed direct to the studding. It can be decorated in any style desired.

We want to send a free sample to every carpenter and builder. Write for yours.

THE HEPPES COMPANY

4502 Fillmore Street **Chicago, Illinois**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Wall Board
Painted with
DULLKOTE

A wall board interior, with Dull Kote, is sanitary, artistic and lasting, and can be washed with a sponge like tile. It permits of tasteful decorative effects, is easily applied and economical in use.

The above are only a few of the many reasons why it is the ideal wall covering for

RESIDENCES, SCHOOLS, CHURCHES, STORES, PUBLIC BUILDINGS

But be sure it's Dull Koted.

Johnston's Dull Kote Paint contains no white lead or anything injurious. It will not rub, flake or peel off, dries hard with a washable surface, free from brush marks or laps.

We will send any Architect, Carpenter or Owner our free color folder and valuable suggestions for interior decoration. Send your name in today.

The R. F. Johnston Paint Co.
Pearl and Main Streets, Cincinnati, Ohio

The above illustration demonstrates the utility of **Bestwall** for lining corrugated iron buildings. The photograph shows a corner of a storage building of the Commercial Chemical Co., Clearing, Ill., which has been converted into a Peroxide Plant and Bottling Department.
A large number of girls are now employed in this building, which could formerly be used only for warehouse purposes owing to the impossibility of heating it in Winter.
Bestwall lining in a corrugated iron building makes it possible to heat the building economically in Winter. It also makes the building cooler in Summer.

Trade Prices to Contractors

Bestwall

THE ONLY SATISFACTORY
WALL BOARD
Fire Proof

A REAL BUILDING MATERIAL
(Not made of paper or wood pulp)

FOR THE ENTIRE HOUSE
No Panel Strips are Necessary

Send for Descriptive Booklet
Sample on Request

BESTWALL MANUFACTURING COMPANY

Warehouses:
Cleveland, O. St. Louis, Mo.
Kansas City, Mo. Lincoln, Neb.

1247 First National Bank Building
CHICAGO

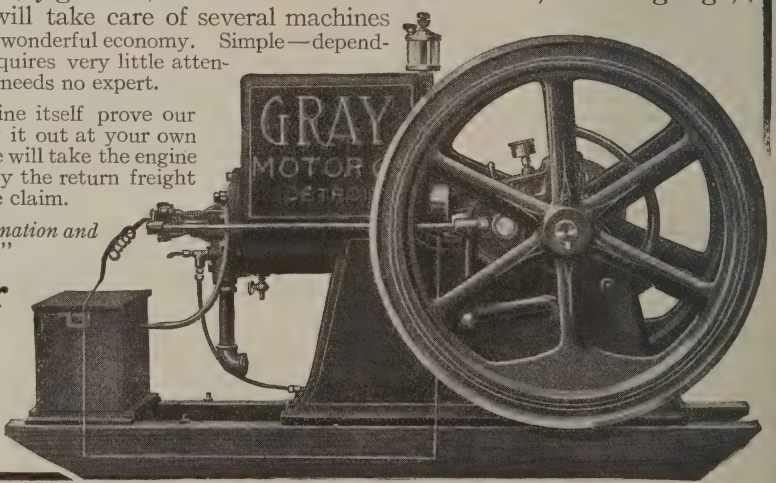
Pacific Coast:
California Bestwall Company
Rialto Building, San Francisco

RELIABLE POWER FOR THE CONTRACTOR AND BUILDER

HERE is just the engine you need—has no superior at shop work, either portable or stationary. Runs band saws, emery wheels, cutoff saws, jig saws, combination woodworkers, hoisting rigs, cement mixers, and will take care of several machines belted to line shaft with wonderful economy. Simple—dependable—long lived and requires very little attention. Engineers itself—needs no expert.

30 Days TRIAL Let the engine itself prove our claims. Try it out at your own work and we will take the engine back and pay the return freight if it is not everything we claim.

Write today for full information and ask for Engine Book "S."



Gray Motor Company

1181 G. M. C. Bldg.
DETROIT, MICH.

A NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"SAVED US $22 IN ONE DAY"

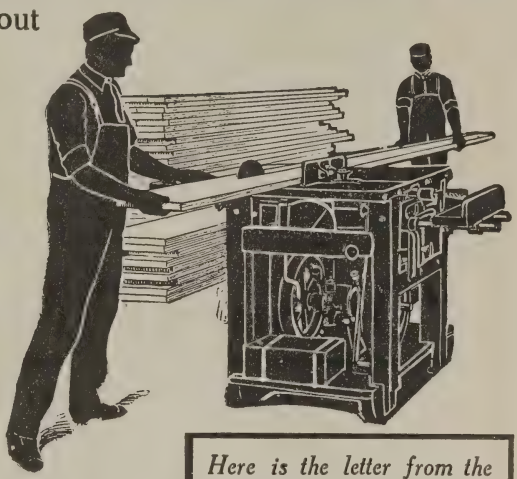
says a prominent lumber firm of Kansas City, in writing us about

THE

TRADE OSHKOSH MARK

"EVEREADY" SAW RIG

"GUARANTEED FOR LIFE"



Lots of others praise it just as strongly. So would you if you realized what it will do to facilitate your work, save time and cut your labor costs. It's strong and rigidly built from the ground up—"guaranteed for life." Portable—take it anywhere. Keep it for shop-work or have it "on the job" when you get a big contract. It's self-contained—always ready to run—no setting up or connections to make. Instant-starting gasoline engine furnishes abundance of power always. And the beauty of this machine is you can do anything with it for it has every attachment the contractor and builder needs. It's a complete "mill" in itself.

Here is the letter from the Deallbrage Lumber Co., of Kansas City:

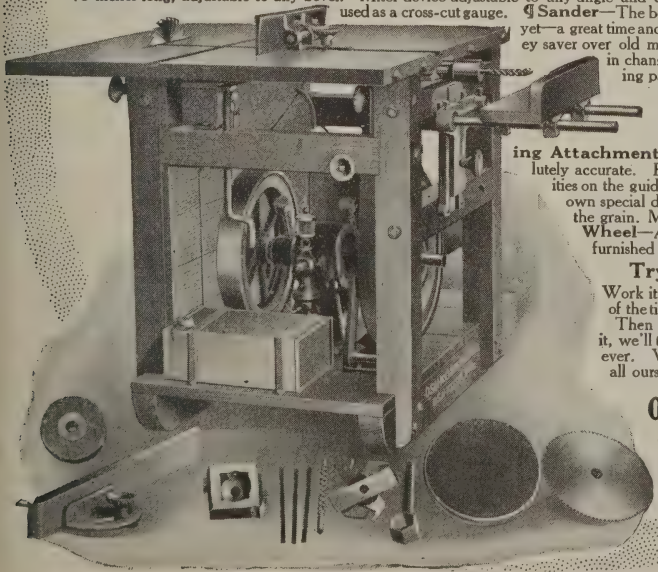
"The saving in time and the utilization of what would, without the use of the machine, be waste or low grade material, has been a source of constant satisfaction and profit to us.

In one day it saved us the net amount of $22.00.

"It has been operated throughout by the regular yard force, among whom there is not one making any pretension of mechanical knowledge."

ALL THESE ATTACHMENTS FREE

Jointer Head—This works on exactly the same principle as an up-to-date planer. Produces a smooth, even job, with no deep cut as the material leaves the jointer head. 2½ inches in size. ¶ **Saw Gauge and Miter Device**—Saw gauge of the best grey iron, 18 inches long, adjustable to any bevel. Miter device adjustable to any angle and can be used as a cross-cut gauge. ¶ **Sander**—The best one yet—a great time and money saver over old methods in change and economy of paper. Our method of holding paper will not blister as do many others. 10 inches in diameter. ¶ **Jig Saw**—Not a cheap one, but the best 12-inch jig we can make. All joints reinforced with steel, equipped with brass bushings. Once use it and you won't part with it. ¶ **Boring Attachment**—A high-class attachment. Guaranteed absolutely accurate. Extra long boxes insure easy, long running qualities on the guides. Bits standard sizes. ¶ **Dado Head**—Our own special design. Does smooth, even work with or across the grain. Makes window frames, dados, etc. ¶ **Emery Wheel**—A 6-inch wheel made for grinding tools is also furnished with this rig.



Try It a Week at Our Risk

Work it hard—use all the attachments. Keep track of the time and fuel and compare with hand labor. Then if you think you can get along without it, we'll take it away, making no charge whatever. Write for details today—the risk is all ours.

Oshkosh Mfg. Co.
414 S. Main Street
OSHKOSH,
WIS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT. BUILDER

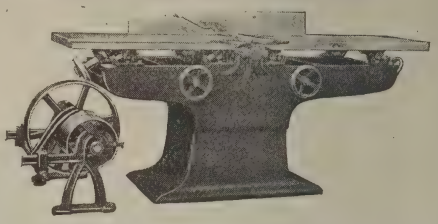
Saw Tables, Jointers, Swing Saws and Band Saws

Silver's New Woodworking Machines are the newest, most improved tools on the market. The cut gives a slight suggestion of their neatness of design and construction.

In rigidity, in ease and convenience of operation, in moderate price, they beat all others to a frazzle.

Jointers, 8, 12, 16, 20 24-in. Band Saws, 20, 26, 32, 36-in. Swing Saws, 6½, 7, 7½, 8-ft.

Silver's Machines are high-pressure machines. They will do your work to the limit and do it well.



GET OUR PRINTED MATTER AT ONCE AND LOOK INTO IT

The Silver Mfg. Co. 340 BROADWAY SALEM, OHIO

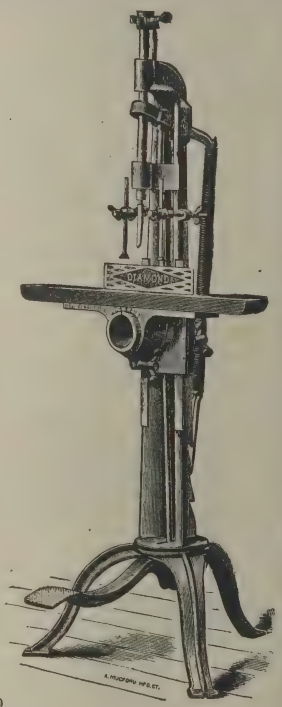
"Diamond" Mortiser

FOR FOOT POWER

Will mortise ⅛ to 1 inch wide, 3 inches deep or 6 inches deep by reversing the work, and with our patent adjustable tenoning tool will cut tenons ⅛ to 1 inch wide. Has rigid iron column, powerful foot motion and accurate action. The table has horizontal, vertical and angle adjustments.

It takes up but little space, is light and can be easily moved about to accommodate your work.

We make a complete line of Foot, Hand and Light Power Wood-working Machinery suitable for Carpenters, Builders, Cabinet Workers and other Woodworkers. It will pay you to investigate their merits.



Send for Catalog "A."

The Seneca Falls Mfg. Co.
629 WATER STREET
Seneca Falls, N. Y., U. S. A.

299

THE STANDARD PORTABLE COMBINATION WOODWORKER

NINE MACHINES IN ONE EQUIPPED WITH **6 H. P. ENGINE**

SEND FOR ILLUSTRATED CATALOGUE

ATLANTIC ENGINE COMPANY, Inc.
MERCER STREET - - - - MEADVILLE, PA.
CANADIAN OFFICE, BRIDGEBURG, ONT.

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OUR OWN GUARANTEED BAND SAWS
enuine Swedish steel, replaced free if not O. K.
(Brazed, Set and Filed, Ready for Use)

Net Prices:	3/16"&¼"	⅜"	½"	⅝"	¾"	1"	1¼"	1½"
10′ to 14½′ Long	$ .90	1.05	1.10	1.25	1.50	1.80		
15′ to 16½ "	1.00	1.10	1.15	1.40	1.65	2.00	2.50	3.00
17′ to 18½′ "	1.10	1.25	1.35	1.50	1.80	2.15	2.75	3.25

Other Sizes at Proportionate Prices

All Orders Filled Same Day Received

Circular Saws

RIP OR CUT-OFF

Diam.	Price
8"	$1.20
10"	1.65
12"	2.20
14"	2.65
16"	3.25
18"	4.00

Be sure to state whether Rip or Cut-off and size of bore. Special Saws and Dado Heads.

Less 5% For Cash With Order

Planer Knives Bits and Cutters

Of Every Description

SEND US A TRIAL ORDER

Our Service

(as well as our Prices and Quality) WILL KEEP YOU ON OUR BOOKS.

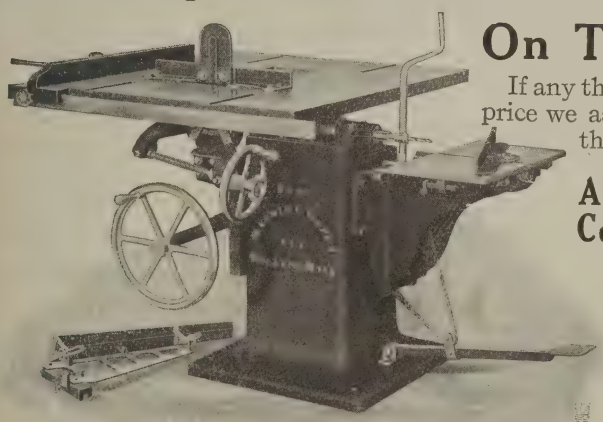
REMEMBER

We carry the Largest Stock of both New and Rebuilt (Guaranteed) **Woodworking Machinery** in the U. S. Woodworkers' Tools and Supplies of every description.

SERVICE!!!

Here's $350.00 Quality for $195.00

Contractors and Builders: Don't Buy "Shoddy" Stuff or Toys when you can get **REAL MACHINES** of the **HIGHEST QUALITY**



On This Guarantee:

If any thing we sell you is not worth the price we ask, send it back, and we stand the freight both ways.

A High Grade Tilting Table Combination Saw,

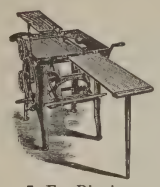
Dado, Jointer, Tenoner, Boring Machine, Hollow Chisel Mortiser—in fact a whole woodworking plant in one tool—complete with one each 14" Rip and Cut-off Saw, ½" to ¾" x 8" Dado Head, 5" Jointer Head and Knives, 3" Tenoner Head and Knives, 4 Boring Bits, 2 Hollow Mortising Chisels and Bits, for **$195.00**

ORDER TODAY ON TRIAL—If it don't suit you, send it back at our expense.

CHICAGO WOODWORKING MACHINERY CO.

162-166 N. Clinton St. *(COME IN TO SEE US)* **CHICAGO, ILL.**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



I. For Ripping.

CARPENTERS! BUILDERS!

Our new foot and hand power Circular Saw No. 4 is the strongest, most powerful and in every way the best machine of its kind. For ripping, cross-cutting, boring, grooving, dadoing, etc.

SEND FOR OUR NEW CATALOG on Foot and Hand Power Machinery, Lathes, Scroll Saws, Formers, Mortisers, Tenoners, Etc.

II. For Cross-cutting.

Solid Iron Table Planed Perfectly True—Counter-Shaft if desired

III. With Universal Mitre Gauge.

W. F. & JOHN BARNES CO., 436 Ruby Street ROCKFORD, ILLINOIS

Does All Your Woodworking at 20c per day

You can buy a dozen woodworking tools and build a special shop.

You can have your woodworking done outside at current prices.

But you can't get *better* service or *more accurate* work than this unique woodworking outfit will give you — *at a cost of but 20 cents per day.*

A Complete Woodworking Plant Ready for Instant Service—Anywhere.

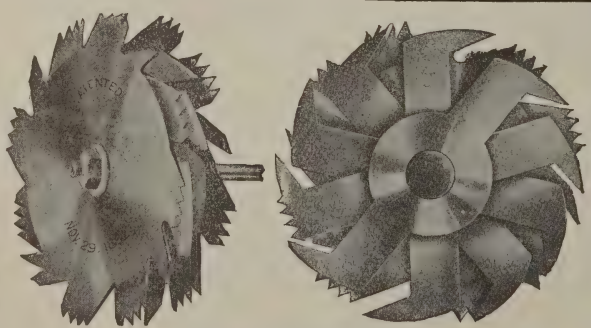
In a concise, corner-fitting outfit, you get saw, jointer, sander—twelve machines in all.

No delays. No idle machines. A man readily wheels this tool to the spot needed and does the work at once.

This is the original portable saw rig—embodying wide experience in the manufacture of concise, convenient and sturdy tools. Driven by self-contained gasoline engine or can be connected for belt drive.

Write today for descriptive folder showing different sizes and prices

C. H. & E. MANUFACTURING COMPANY, Inc.
319 Mineral Street **Milwaukee, Wisconsin**



Showing Arrangement of Cutters

HUTHER BROS. PATENT GROOVER OR DADO HEAD

Will Save Cost in Three Days Use

Can Be Used on Any Circular Saw Mandrel

For cutting any width groove from ⅛″ to 2″ or over. Will cut a perfect groove, either with or across the grain, and leaves edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

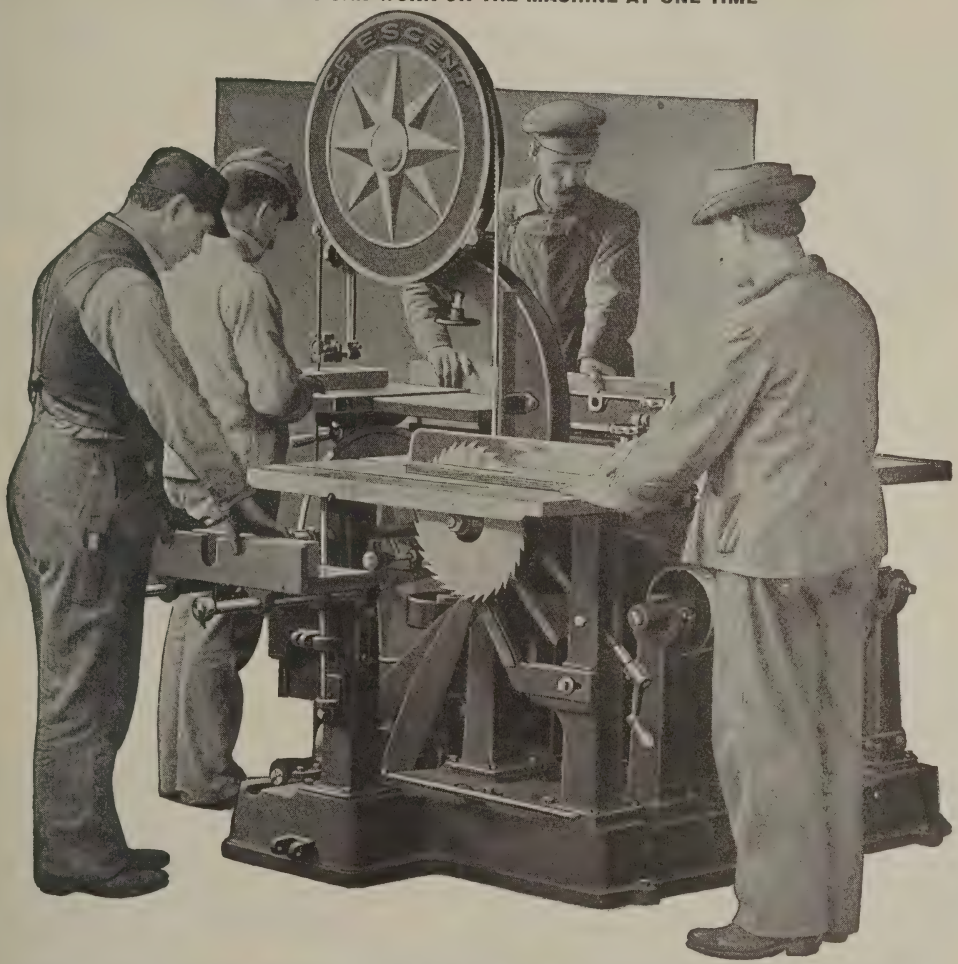
HUTHER BROS. SAW MFG. CO.
500 University Ave. **Rochester, N. Y.**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

INCREASE THE PROFITS FROM YOUR BUILDING OPERATIONS BY TURNING OUT YOUR MILL WORK ON THE

CRESCENT UNIVERSAL WOOD WORKER

FOUR MEN CAN WORK ON THE MACHINE AT ONE TIME



THE CRESCENT UNIVERSAL WOOD WORKER

consists of band saw, saw table, jointer, reversible single spindle shaper, and borer. Various attachments can be added adapting the machine for grinding knives, doing disk grinding, mortising, tennoning, panel raising, resawing, making mouldings, rabbetting.

Send for special catalog No. 51 and find out all about this splendid machine. At the same time ask for catalog of band saws, jointers, saw tables, planers, shapers, variety wood workers, swing saws, disk grinders and borers.

THE CRESCENT MACHINE COMPANY, 10 Main Street, LEETONIA, OHIO

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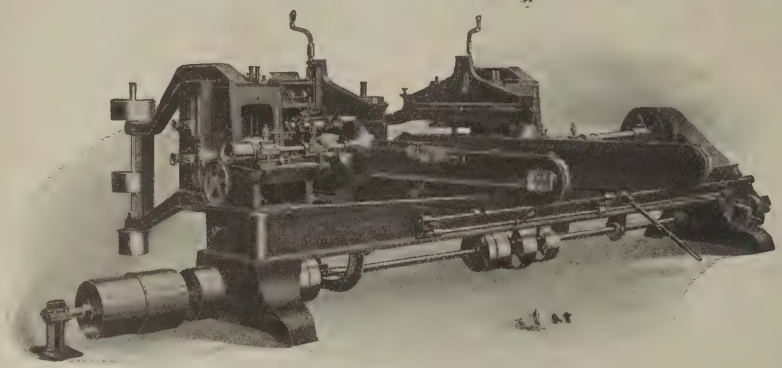
MAT BUILDER

SMITH OF SMITHVILLE

Established 1847

Woodworking Machinery

Incorporated 1878



AUTOMATIC TENONING MACHINE No. 200Be

IMPROVED Woodworking MACHINES for many PURPOSES.

Send for Literature.

H. B. SMITH MACHINE CO., Smithville, N. J., U. S. A.

New York Chicago Atlanta San Francisco

This is a new Designed Porcelain Enameled Roll Rimmed Sink,

$16.85 For This $28 Outfit

having Back and Drain Board all in one piece—Wall Hanger, Adjustable Legs, Concealed Galvanized Air Chambers, Nickel-plated Strainer, Fuller Adjustable Flanged Bibbs and "P" Trap, with waste to wall. Sink is 20 x 30 inches, with 20 x 24 inch counter, sink drain brass; 12 inch back extending over sink, and runboard all in one piece. **This low price of $16.85 includes two $1.50 Faucets, and the large 1½ inch Trap. Send in your order now—you will find this a good BUY.**

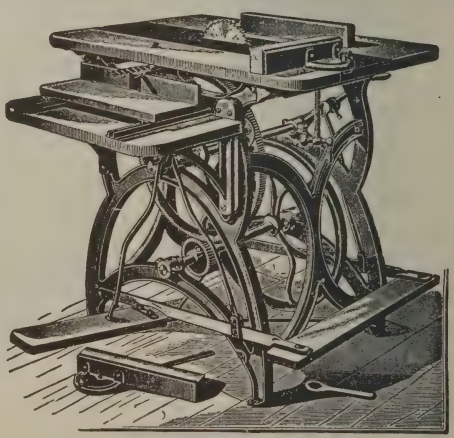
WRITE FOR OUR FREE CATALOG TOO

It shows a splendid line of modern Bathroom Outfits, from $38.95 to $175.00, Water Pressure Systems, Hot Water and Steam Plants, and an endless assortment of pipe, valves, fittings, etc. Everything high class and strictly guaranteed. **Sold direct to you at lowest prices.**

JOHN HARDIN COMPANY

25 years at the same address

4541-4549 Cottage Grove Ave. Chicago, Ill.



MARSTON'S

Hand and Foot Power Circular Saw

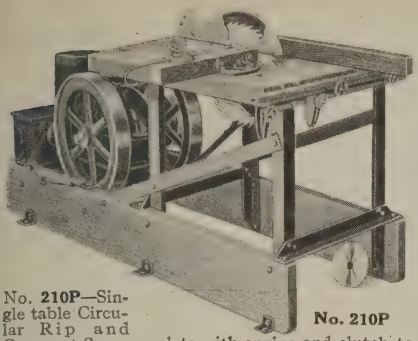
Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two saws and two crank handles with each machine. Weight, complete, 350 pounds.

Send for Catalog

J. M. MARSTON & CO. 193 Ruggles Street BOSTON, - MASS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Parks Portable Single and Combination Woodworking Outfits



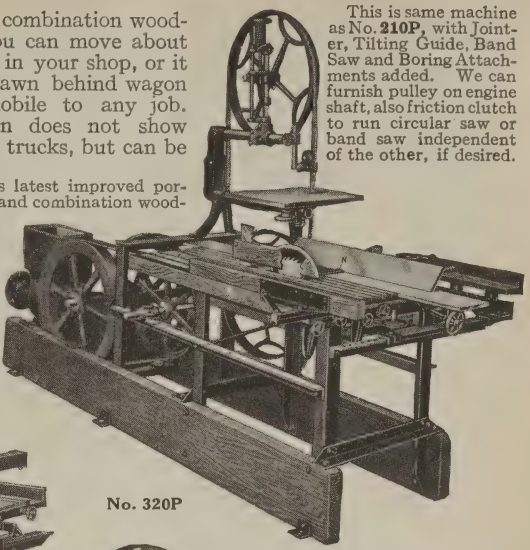
No. 210P

No. **210P**—Single table Circular Rip and Cross-cut Saw complete with engine and clutch to start and stop saw, belted up ready for use, **$67.50**

Jig Saw, Sand Disk and other valuable attachments can be added.

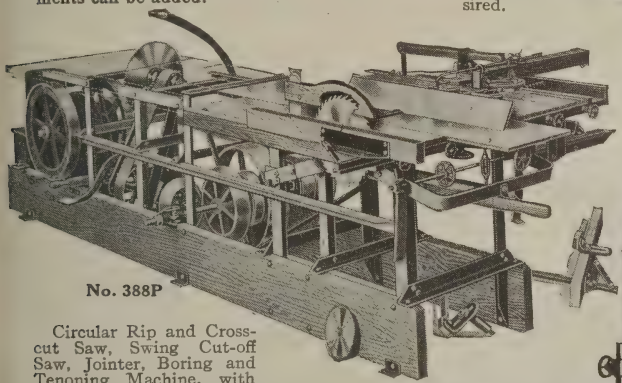
Here is a combination woodworker you can move about anywhere in your shop, or it can be drawn behind wagon or automobile to any job. Illustration does not show wheels or trucks, but can be furnished.

These Parks latest improved portable single and combination woodworking machines can be equipped with gasoline engine, electric motor or attachments for driving with automobile if desired.



No. 320P

This is same machine as No. **210P**, with Jointer, Tilting Guide, Band Saw and Boring Attachments added. We can furnish pulley on engine shaft, also friction clutch to run circular saw or band saw independent of the other, if desired.

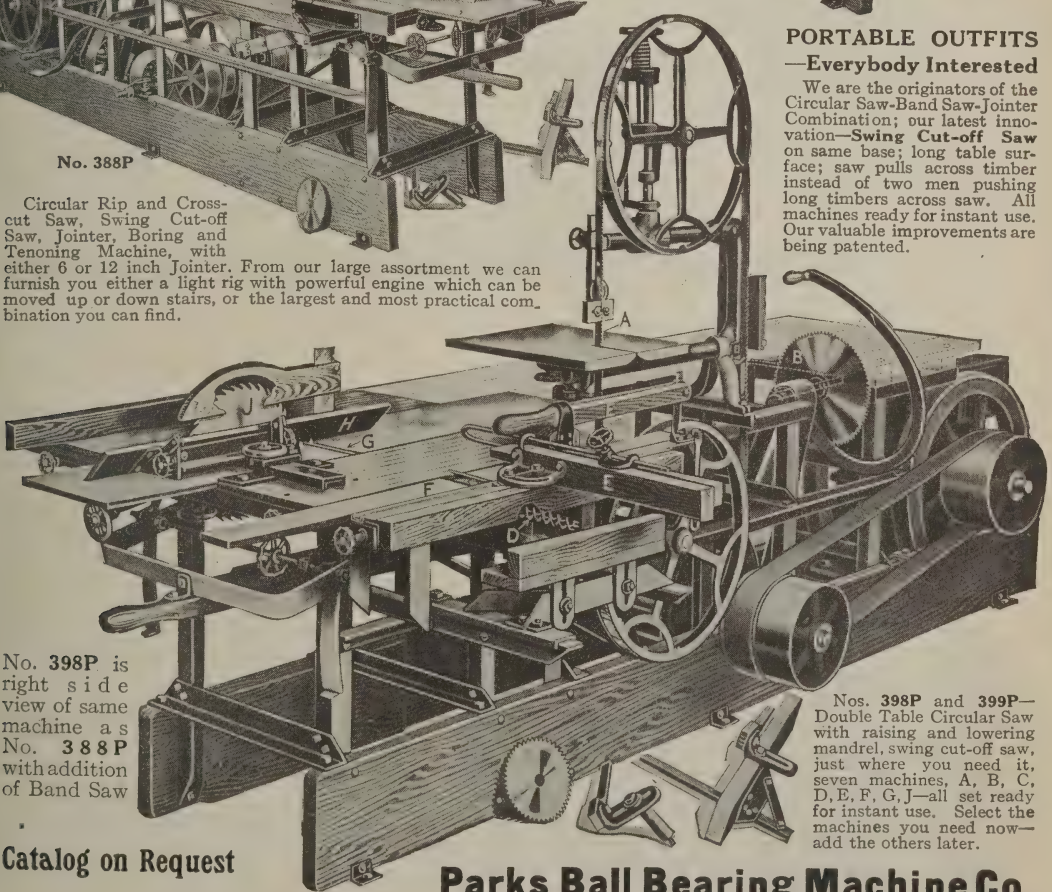


No. 388P

Circular Rip and Cross-cut Saw, Swing Cut-off Saw, Jointer, Boring and Tenoning Machine, with either 6 or 12 inch Jointer. From our large assortment we can furnish you either a light rig with powerful engine which can be moved up or down stairs, or the largest and most practical combination you can find.

PORTABLE OUTFITS —Everybody Interested

We are the originators of the Circular Saw-Band Saw-Jointer Combination; our latest innovation—**Swing Cut-off Saw** on same base; long table surface; saw pulls across timber instead of two men pushing long timbers across saw. All machines ready for instant use. Our valuable improvements are being patented.



No. **398P** is right side view of same machine as No. **388P** with addition of Band Saw

Nos. **398P** and **399P**—Double Table Circular Saw with raising and lowering mandrel, swing cut-off saw, just where you need it, seven machines, A, B, C, D, E, F, G, J—all set ready for instant use. Select the machines you need now—add the others later.

Catalog on Request

Parks Ball Bearing Machine Co.

Knowlton and Fergus Sts. **CINCINNATI, OHIO, U.IS. A.**

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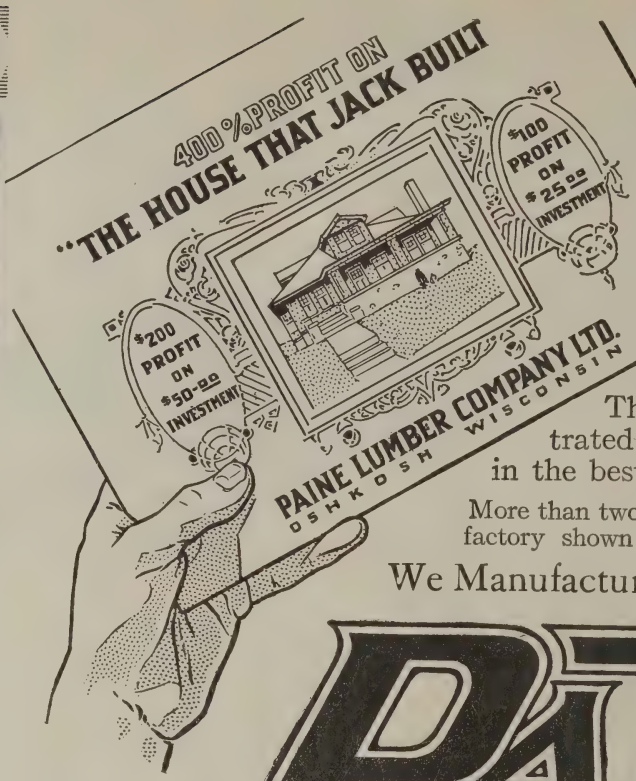
PAINE


400% PROFIT ON
"THE HOUSE THAT JACK BUILT
$100 PROFIT ON $25.00 INVESTMENT
$200 PROFIT ON $50.00 INVESTMENT
PAINE LUMBER COMPANY LTD.
OSHKOSH WISCONSIN

MR. BUILDER:

YOU MUST

1st: "Cut out" *high*

2nd: CUT OUT

Send it to us and
House that Jack
Paine doors and
ing $50 more for Paine

The book relates the actua
trated. It also contains *valuable*
in the best made doors. *You want*

More than two-thirds of the world's standard
factory shown below. Correspondence in

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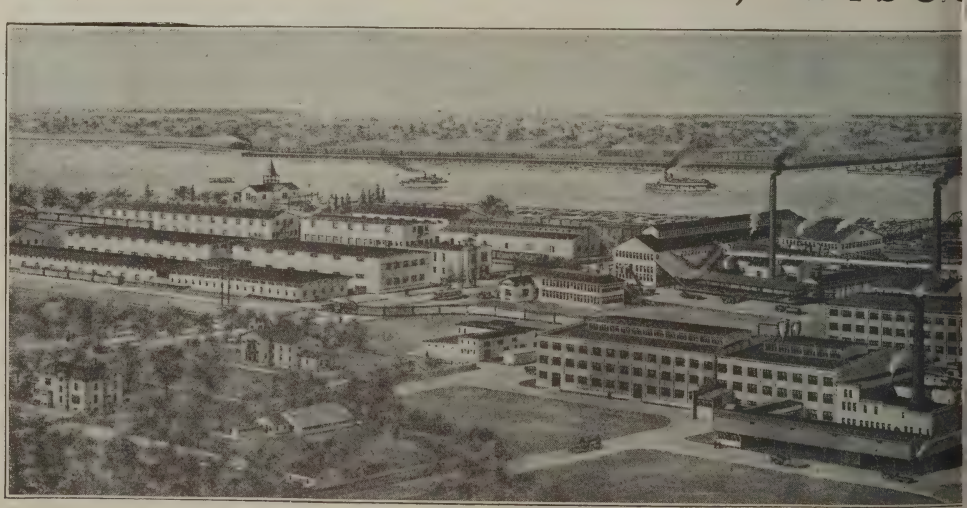
PAIN

KLIMAX

"ORIGINATORS OF THE STANDAR

OSHKOSH, WISC



PAINE

KORELOCK

To Make More Money
CUT OUT TWO THINGS:—

prices and *low quality*. They *don't pay*.
THIS COUPON and get the NEW PAINE BOOK—it DOES pay

you will receive promptly our *new* volume "*The Built.*" It proves that by spending $25 more for trim you increase your value $100—how by spend- doors and trim you add $200 value.

experience of a home-builder and is attractively illus- *detail drawings* and examples of the best selling styles *this book. Write for No. "Z." Get it at once.* You *need* it.

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in Millwork—in Every Kind of Wood

LUMBER CO., LTD.

HARDWOOD VENEERED DOOR
NSIN, U. S. A.

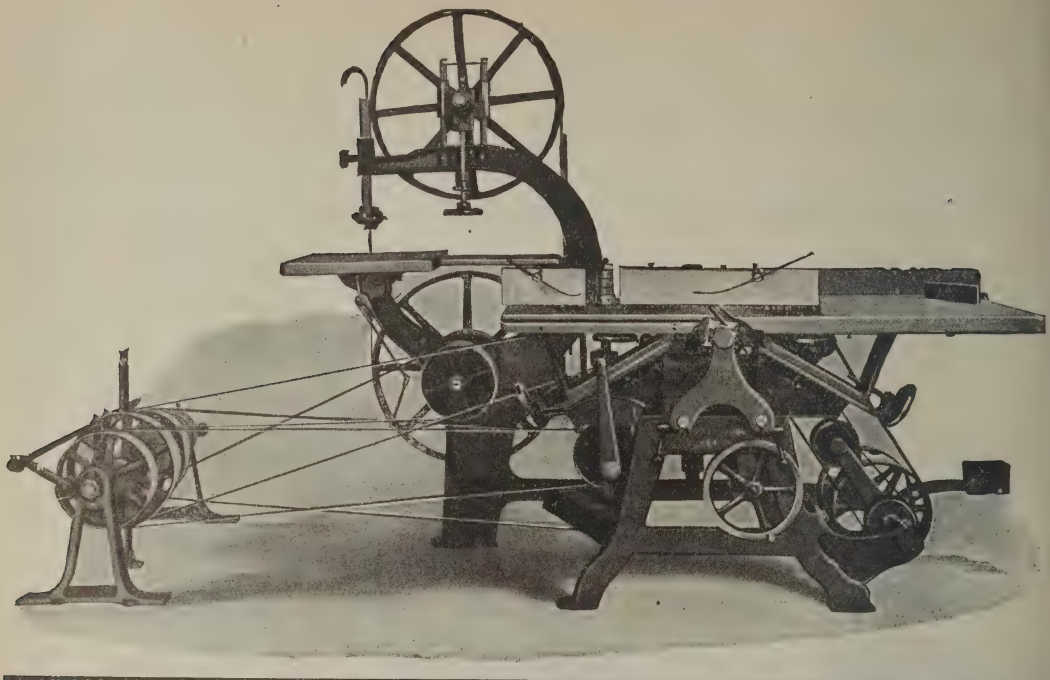
KORELOCK

Paine Lumber Co., Ltd.
Oshkosh, Wis.
GENTLEMEN: Please send me your book, "The House That Jack Built," by return mail.
NAME .....
ADDRESS .....

PAINE

KLIMAX

PAINE



Sixteen machines are embodied in the FAMOUS Universal Woodworker; here they are:

1—27-inch Band Saw.
2—12-inch Jointer.
3—Saw Table, with raising and lowering arbor.
4—Single Spindle Shaper.
5—Boring Attachment, arranged on special boring spindle.
6—Pony Planer.
7—Tongue and Pole Rounder.
8—Hollow Chisel Mortiser.
9—Single End Tenoner.
10—Drum Sander.
11—Disc Sander.
12—Knife Grinder.
13—Emery Grinder.
14—Band Re-Saw.
15—Spoke Tenoner, Rim Borer and Wheel Equalizer.
16—Adjustable Felloe Rounder.

PROBABLY YOU CANNOT AFFORD sixteen woodworking machines, although you have sixteen different kinds of work to do.

MAYBE YOU HAVEN'T THE FLOOR space to spare for more than one machine—yet you would sooner do the work in your own shop than give it out to planing mills.

BIGGER PROFITS YOU WANT AS A matter of course, and no doubt you realize that you can do your own millwork cheaper than a planing mill can.

THE ANSWER TO ALL THIS IS THE famous Universal Woodworker which does sixteen different kind of millwork but is only one machine, occupying very little floor space, and is low enough in price to be within the reach of every carpenter, builder and contractor.

THE FAMOUS HAS REVOLUTIONIZED the woodworking machinery business during the past three years. Over 1,400 Carpenters and Builders have bought Famous Universal Woodworkers, simply because the Famous showed them the way to get out millwork CHEAPER and QUICKER than ever before—the way to bigger profits.

WHAT'S THE USE OF DELAYING THE matter? Why don't you investigate it further? It costs you nothing to make us get down to brass tacks and show you thoroughly why a FAMOUS will make your business more profitable.

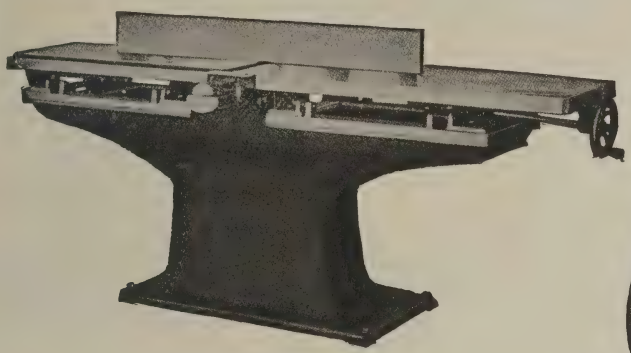
Drop us a line to-day. Ask for our catalog and terms.

The Sidney Tool Co., Sidney, Ohio

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

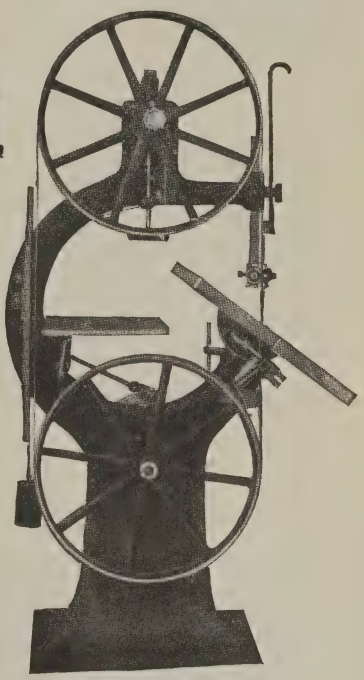
$180.00 for all Three To Contractors and Builders

Ask for Price on One if You Can't Use All

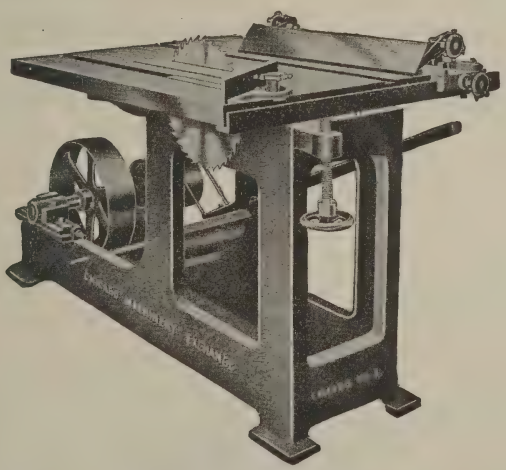


Chicago 8-Inch Jointer and Planer

Used for Planing, Jointing, Shaping, Matching, Rabbeting, Grooving, Chamfering, Beading and Making Mouldings



27-Inch Chicago Band Saw



Chicago No. 5 Combination Saw

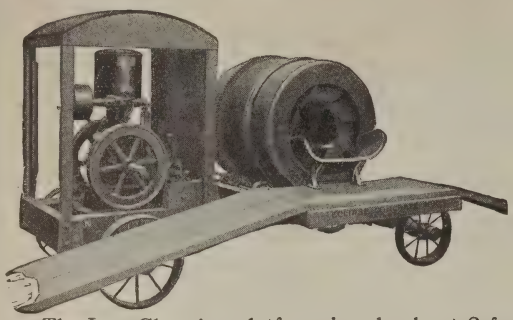
Will Cross Cut, Rip, Miter, Bevel-Rip, Dado, Bore and Tenon. Hollow Chisel Mortising Attachment can be furnished.

Send for our Free Special Catalogue today. We issue a catalogue of machines especially adapted to Contractor's and Builder's use

Chicago Machinery Exchange

1217-1225 Washington Boulevard Chicago, Ill.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



"The Standard" LOW CHARGING Concrete Mixer

For Inside Winter Work.

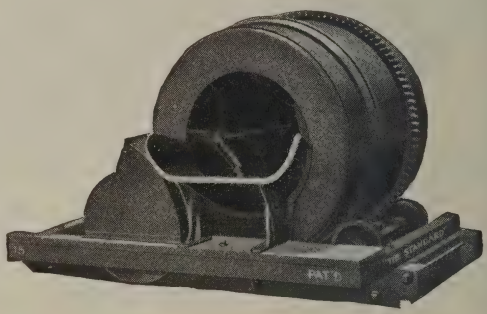
The simple construction of "The Standard" allows it to be placed inside of building or anywhere on the job. No need to be behind in your work or lose money by hand mixing. More output with less expense.

The Low Charging platform is only about 2 feet high and portable with the mixer.

The Semi Automatic discharge can be operated from either side of the drum and is the simplest and quickest discharge on the market. The Open Drum allows the inspection of the entire batch while mixing, assuring a high grade uniform concrete.

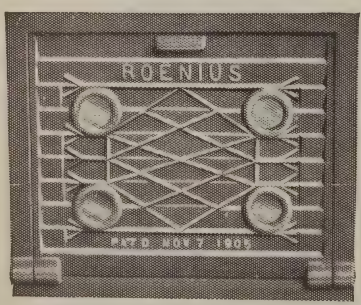
"THE STANDARD" mixer mounted on skids with power directly connected, or for belt drive, is especially adapted for inside work. Can be used to mix either croncrete, cement mortar or plaster.

We will send you our catalog No. 32 upon request.



The Standard Scale and Supply Company

Chicago	Pittsburg	Philadelphia	New York
1345-1347 Wabash Ave.	243-245 Water St.	35 South Fourth St.	136 West Broadway



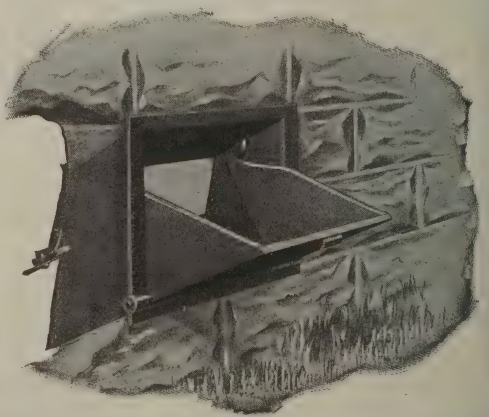
Roenius Wood and Coal CHUTES

Have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed.

Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked.

Roenius style B Chutes are made with glass discs—and this chute is used especially in cases where the only available light must pass through the coal chute.

Ask your dealer for the Roenius—and get the best. Write for Circulars and Prices.



GRAND RAPIDS FOUNDRY COMPANY

MANUFACTURERS

Grand Rapids, WISCONSIN

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Lay Your Own Concrete

AS the forests are cut, builders turn to concrete. Concrete construction is not difficult. It pays liberal profits. Hundreds of contractors are going into concrete every year. *You* can start with a small investment—some wheelbarrows, shovels, small tools and a

Smith Hand Mixer

IT is a *batch mixer,* guaranteed to mix a perfect batch in three slow, easy turns of the drum. Cranks easily—popular with the men. Batch capacity 2½ cu. ft. Output, 25 to 30 cu. yards per day. Weight, 1000 lbs. Guaranteed fully by the biggest mixer concern in the United States.

The T. L. Smith Co.
1336 Majestic Building
Milwaukee, Wisconsin

Let us send you our guarantee and booklet No. 18.

SMITH HAND MIXER 1912 MODEL

The Synonymous Trio

TERRAZO STUCCO

BONNELL IRIS AGGREGATE

A marvelous blending of pink, green, crystalline white, black, and a touch of purple, crushed from the famous IRIS PORPHYRY QUARRIES.

Bonnell Iris Aggregate, Inc.

Have our representative call

501 Fifth Avenue 'Phone 309 Bryant New York City

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

$25.00 $15.00 and $10.00 Cash in Prizes

We want certain kinds of Photos showing floor scrapers in actual use. Drop us a line now for particulars—especially if you use a Fox Scraper.

We will tell you how you have a good chance to earn $25, $15 or $10 for a very slight effort on your part. This is not a scheme to sell you something and there are absolutely no charges to those who enter the contest.

Any one can try for these prizes. Isn't it worth a 2 cent stamp to find out what we have to offer?

FOX SUPPLY CO.
BROOKLYN, WIS.

Fill out this coupon and send it in. DON'T DELAY!

- - - - - - - - - - - - - -

FOX SUPPLY CO., Brooklyn, Wis.

Send me particulars about the Photo Contest.

Name .....

Street .....

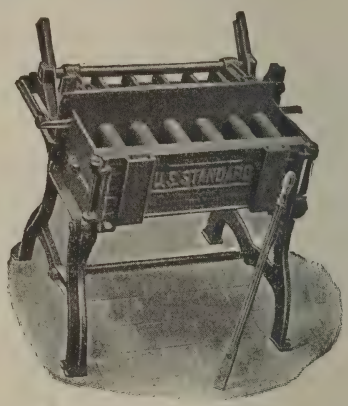
City .....

State .....

NATIONAL BUILDER

PROFITS

In block making are dependent on the simplicity of the block machine to operate quickly and with a sureness of turning out each block perfect.



Three reasons why the **U. S. Standard Block Machines** make money for contractors and builders:

Simplicity

With its sturdy and simple construction any amateur can operate it with a few hints on the essential points. No clamps, chains, cogs, wheels or springs to get out of order.

Speed

Its simplicity gives greater speed than more complicated machines. We challenge competition.

Strength of Block

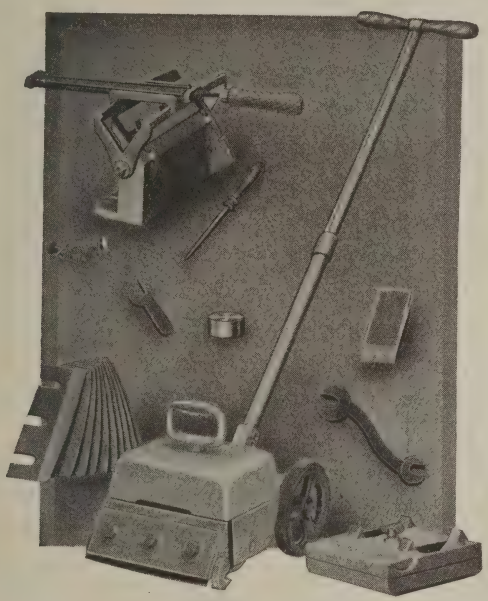
The greater number of small cores instead of two large ones give as much air space and more strength. This is why U. S. Standard made blocks are the nearest to perfection.

Send for detailed information on cost of machine and block making.

The Ashland Steel Range & Mfg. Co.
Ashland, Ohio

NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Why the Acme is the Best Floor Scraping Outfit on the Market.



BECAUSE:—

The floor scraper works automatically.

The blade cannot butt into the flooring.

The handle is adjustable.

The blade can be set at various angles.

There are removable and extra weight attachments.

There is no stooping or lifting while operating.

The blade sharpener puts a perfect edge on each blade.

The sander puts on the finishing touches.

The extra tools are the very best made. And

It enables one man to do the work of four men using hand scrapers.

If these reasons appeal to you and you have any flooring that requires scraping, then let me send you this outfit on **one week's free trial.** You can then give the machines a thorough tryout and if the same do not come up to your expectations and don't do your floor scraping better than it has ever been done before, you can pack up the outfit and send it back to me at my expense.

This is absolutely a **FREE TRIAL OFFER.** No strings to it, just a matter of letting you try before you buy.

I will gladly send you further particulars and catalog on request.

JOS. MIOTKE, 249 LAKE STREET MILWAUKEE, WIS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Scrapes Either Way

—forward or backward. Double-Knife enables you to scrape center of amallest room and into all baseboard angles. Saves time and strength—scrapes every inch perfecily.

The WEBER DOUBLE ACTING Floor Scraper

works successfully on all flooring at any angle, with or against the grain. "Shears" without side-draft. Absolutely the only scraper of its kind. **TRY IT.**

FIVE DAYS FREE

Give it the hardest possible test. If you don't want it then, the trial **won't cost you a cent.** Send for circular **now.**

JOHN F. WEBER, Pres.
Weber Mfg. Co.
661 71st Avenue
Milwaukee, Wis.

No Waves No Chattering

Satisfaction Guaranteed

THE EXCELSIOR DUMB WAITER

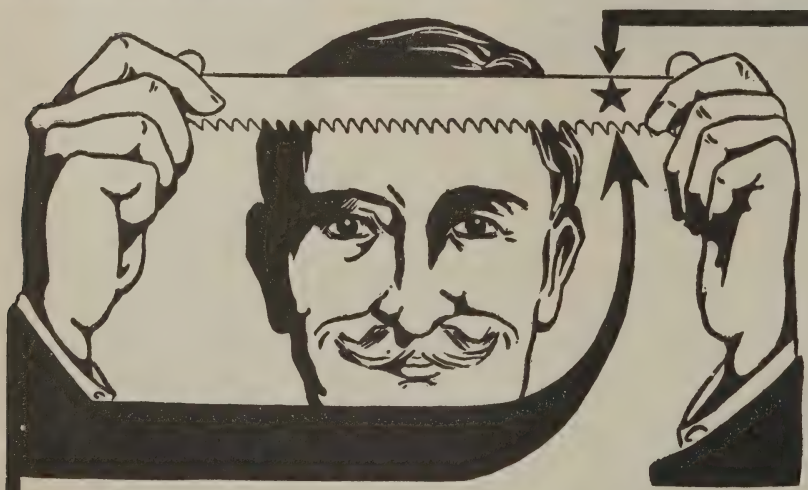
Sent Complete to a Nail **$18.50**

Knocked Down, Ready To Erect

Self Retaining Machine. Hardwood Car. Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one.

Send for Descriptive Pamphlet

R. M. RODGERS & CO.
74 Emerson Place, Brooklyn, N. Y.



The STAR Tells What They Are

See that it is there, and thereby make sure that you are buying both quality and service in Hack Saw Blades

STAR HACK SAW BLADES

are exceedingly popular with dealers and users because of their quality and adaptability.
The dealer who stocks Star Hack Saw Blades will be able to meet all demands without the necessity of carrying a stock of blades of varying widths and number of teeth to the inch.
Star Blades with 14 teeth to the inch are suitable for every class of work except tubing less than 1-16". For this gage use Star Blade with 24 teeth to the inch.
The reasons which make Star Blades good to sell also make them good to use. Write us for our interesting proposition. Our free book "Tool Practice" is worth while sending for.

MILLERS FALLS COMPANY
28 Warren Street **NEW YORK CITY**

NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Scrape Up Money From the Floor

BY RENTING A

Triple "A" Spring-Driven Floor Smoother

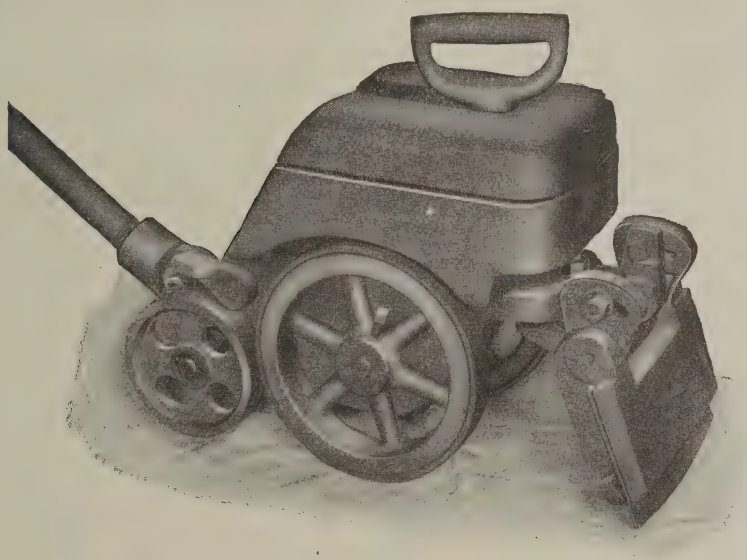
The money you save on each job will pay heavy dividends on our low rental charge. Apply these dividends to the purchase of the machine, and

THE REST IS "TRIPLE "A" VELVET"

You are under no obligation in trying out the TRIPLE "A,"—the best floor surfacing machine in the world. When you get it, you will find it is

A TRINITY OF WORK-PERFORMING POWER

for it's a Scraper, Sander and Blade-Sharpening Machine in perfect combination.



Every floor needs a scrape now and then in your territory, so you need a Triple "A" Machine all the time. There's money in Triple "A" scraping.

TEAR OFF THE COUPON

Triple "A" Machine Company

28 North Clark Street

Chicago

Pin Coupon to your *Letterhead.* Send particulars of your rental proposition and folder describing the **Triple "A" Spring-Driven.**

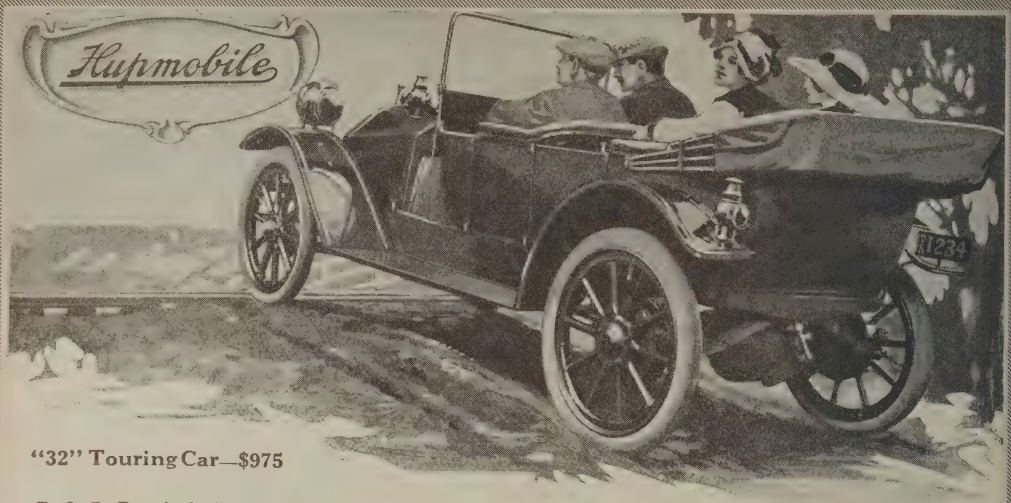
Name .....

Address .....

Business .....

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT. BUILDER



"32" Touring Car—$975

F. O. B. Detroit, including windshield, mohair top with envelope, Jiffy curtains, quick detachable rims, gas headlights, Prest-o-lite tank, oil lamps, tools and horn. Standard color, black. Trimmings, black and nickel. Roadster, fully equipped, $975.

"32" Delivery, fully equipped, $950
"20" H. P. Runabout, fully equipped, $750
F. O. B. Detroit

An axle that *is* an axle

The Hupmobile rear axle is of the full-floating type—a type almost wholly restricted to cars of the highest price.

The chief advantage of this type is that no load whatever is carried on the axle shafts. They do nothing but drive the wheels.

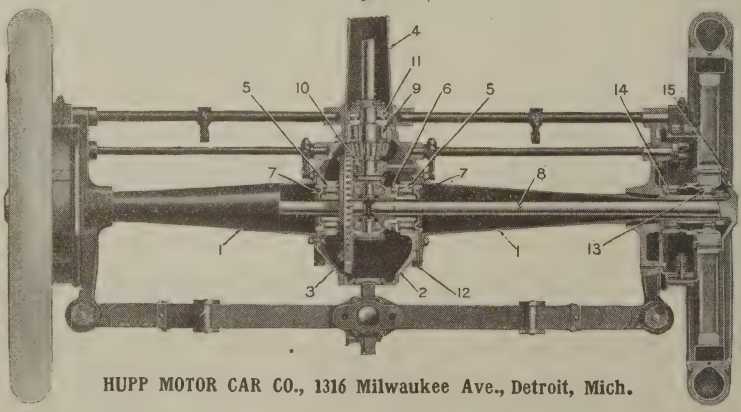
The Hupmobile housing is built up of the two tapered steel tubes, 1, 1, the malleable iron central housings, 2 and 3; and the propeller shaft housing tube, 4—five pieces which form a case so strong and rigid that it does not require the support of truss rods.

The tubes 1, 1, carry the weight of the car. Each wheel runs on two sets of roller bearings, 13 and 14—13 takes the load—14 takes care of the side strains.

Thus, the axle shafts, 8, are freed to do the driving, with flanges bolted to the wheels at 15.

The large roller bearings, 5, 5, take only the up and down loads from the differential, the end thrust bearing being taken by two ball bearings just outside the rollers. One of these is shown at 6.

In mounting the bevel driving pinion, we use two roller bearings, 9 and 10, instead of one, placing one on each side of the gear. They hold it in perfect and permanent alignment, while the ball bearings, 11, take the end thrust. Two threaded adjusters, 7, 7, are used in our axle to set the bevel gear so that proper mesh with the driving pinion is secured and retained.



HUPP MOTOR CAR CO., 1316 Milwaukee Ave., Detroit, Mich.

NAT BUILDER
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

We Convinced Ourselves

of the superiority of our *Copper Bearing Open Hearth ROOFING TIN* by making *long service tests* before placing it upon the market.

We Will Ultimately Convince You

because *real merit* is certain to be recognized.

Write for full information on our high grade Copper Bearing Open Hearth Steel Terne Plates, Continuous Roofing Tin, Apollo Best Bloom Galvanized Sheets, Black Sheets, Formed Metal Roofing and Siding Products, Etc. Send for Weight Cards and New Pocket Reference Book.

American Sheet and Tin Plate Company

General Offices: Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES

Chicago Cincinnati Denver Detroit New Orleans New York Philadelphia Pittsburgh St. Louis

Export Representatives: U. S. Steel Products Co., New York City
Pac. Coast Representatives: U. Steel Products Co., San Francisco, Los Angeles, Portland, Seattle

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

ROCK BOARD FOR WALLS AND CEILINGS

"ROCK" stands for firmness and durability.

ROCK BOARD FOR WALLS AND CEILINGS

In using ROCK WALL BOARD you are getting a material of *quality* and *durability*. It has a splendid surface for decorating and can be finished in any artistic manner. Possibly you have an attic or a room you would like partitioned off—this is the best material for the purpose.

ROCK WALL BOARD is the modern material for remodeling or partitioning every room in any kind of building. It is easily applied, sanitary and economical.

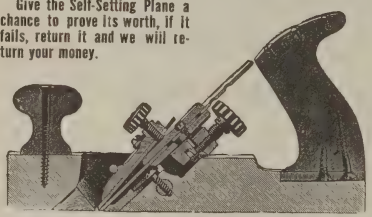
ROCK BOARD is made in panels 32 and 48 inches wide by 6, 7, 8, 9 and 10 feet long.

Write us for further information, and beautifully illustrated booklet.

ROCKFORD PAPER BOX BOARD CO., Department R. ROCKFORD, ILLINOIS

INTRODUCTORY TRIAL OFFER

Give the Self-Setting Plane a chance to prove its worth, if it fails, return it and we will return your money.



If the SELF-SETTING PLANES are not sold in your town and you write us saying, "I saw your trial offer in N. B.," we will send you particulars, a carpenter's pencil and our $1.00 CERTIFICATE, which we will receive as $1.00 in part payment for a SELF-SETTING PLANE, as stated in our $1.00 CERTIFICATE, and if this S. S. PLANE is unsatisfactory and returned at our expense, we will send you $1.00 more than you sent us, as the $1.00 CERTIFICATE says.

As this paper guarantees we will do as our advertisement says, you know the plane must be O. K;

ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained eaty, knurly, knotty, hard or soft wood you can find, THAT IS FREE FROM SAND OR DIRT.

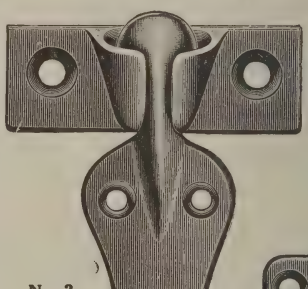
If it is not worth to YOU or YOUR MEN, TWICE ITS COST, return it at our expense, as above stated.

If you send us the addresses of ten carpenters, no matter where they live, we will send you another carpenter's pencil, hard and tough.

Carpenter's Hard, Tough Pencils, 30c per dozen postage prepaid.

GAGE TOOL COMPANY, Vineland, N. J.

STORM SASH AND SCREEN HANGER Nos. 1 and 2



No. 2

The time is drawing near at hand when carpenters and builders begin putting up storm sash and it might be well to say that the best and most convenient goods are always the cheapest in the end.

We make the only Ball and Socket Hangers on the market. One trial will convince you that they are the best.

No. 1

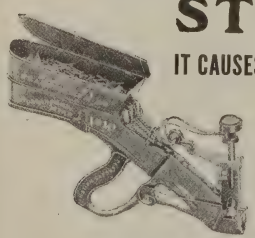
Our No. 1 Fastener is made of the best steel wire. It holds the sash firmly against the blind stop and prevents rattling.

Manufactured by the

Diehl Novelty Company, SHEBOYGAN, WISCONSIN

Send for Catalogue

STOP MOUTHING NAILS

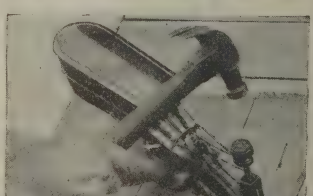


IT CAUSES SERIOUS DISEASES OF MOUTH AND STOMACH

Pearson's Automatic Shingle Nailer will carry nails in a sanitary way—and at the same time make it possible for you to drive more nails—do it with gloves or mittens on—and save you money on every job—works well on roofs of any pitch—holds between 500 and 600 nails.

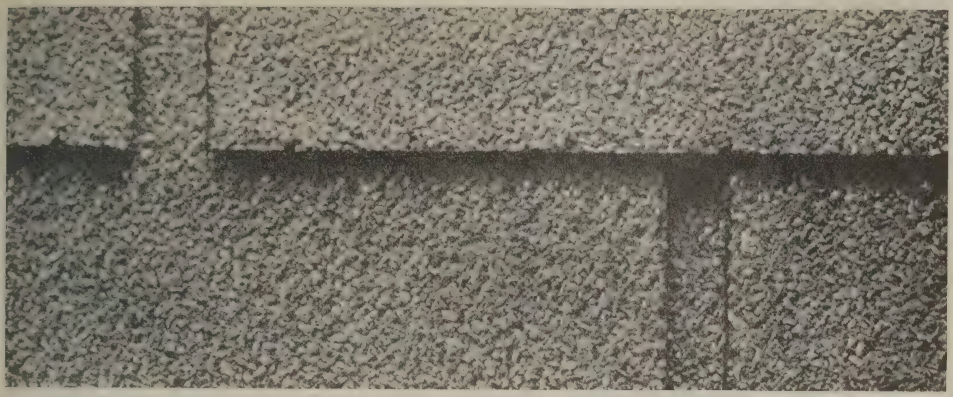
PEARSON NAILERS are made in two sizes.

The Blue Nailer is for common 3d, No. 14 gauge wire nails and the Red Nailer is for the **galvanized** 3d, No. 13, 1¼ in. wire nails. Order from your dealer or send **$5.00** for either one—express prepaid. Money cheerfully refunded if Nailer is not as represented. *Write for Circular "N."*



PEARSON MFG. CO. ROBBINSDALE, MINN.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



IT is almost impossible to set fire to a roof that is covered with FLEX-A-TILE ASPHALT SHINGLES—and fire resistance is only one of their remarkable qualities.

FLEX-A-TILE
ASHPALT SHINGLES

Are made of solid Asphalt, into the surface of which is rolled, under heavy pressure, chipped slate or granite. This not only gives a rich, artistic surface to the shingle, but it makes it impervious to weather and the elements. The chipped slate and granite are **grayish green** and **deep red**—natural color—hence time and weather have no effect on them.

FLEX-A-TILE Asphalt Shingles are 8 inches wide by 12½ inches long. They are laid in half the time required for wood shingles—they cost less than stained wood and they last much longer.

Send your name today—we want to send you a free sample

THE HEPPES COMPANY 1012 FORTY-FIFTH AVENUE CHICAGO, ILLINOIS

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Trus-Con Joist Hangers

Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.

Avoid cutting away and weakening of timbers and walls—save labor, time and money.

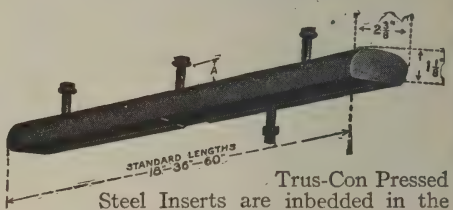
TRUS-CON JOIST HANGERS are made from open hearth steel plates, and are proven by actual test to be the strongest on the market. Note the bulb-shaped reinforcement at upper angle.

We also furnish Post Caps, Post Bases, Wall Plates and Base Plates made in rolled steel, malleable iron or cast iron.

Write for catalog and prices.

Shaft Hanger Supports for Concrete Buildings

Trus-Con Pressed Steel Inserts for Supporting Shaft Hangers in Concrete Buildings.



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The NATIONAL BUILDER

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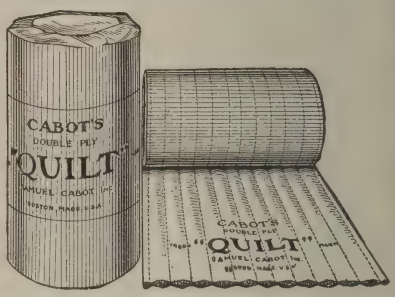

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THE NATIONAL BUILDER

Vol. 54 (48th Year) CHICAGO, NOVEMBER, 1912. No. 7

Muskegon Bungalow No. 1. Cooper & Alting, Builders.

NATIONAL BUILDER DESIGN NO. 359.

For Floor Plans, Details, etc., see Supplement of this number. Estimated cost, architect's fees not included, $3,585.76.

Two Cottage Bungalows

THE very word "bungalow" has a strange fascination for some persons, more particularly, perhaps, for members of the more romantic sort. It is frequently to be met with in the writings of Rudyard Kipling, and to the readers of his and like works, it is suggestive of the easy-going life of the sunny Orient. In this way the bungalow has in many quarters acquired a certain commercial value, besides, and maybe beyond that to which it is fairly entitled upon its own merits as a place of simple habitation.

In order the better to appreciate our subject at its right value, it may perhaps be as well to state here at the outset that bungalow is an Anglo-Indian word derived from the Hindustan "bunga," meaning belonging to Bengal. As the term is used in the country of its origin, "bungalow" implies a long, low, rambling building, with a projecting roof and a wide veranda all round. Transplanted to other climes, the bungalow has undergone, and very properly undergone, various modifications so as the better to adapt it to its changed climatic environments. The chief underlying idea

has, however, been more or less faithfully preserved throughout these various transformations.

In the sunny state of California, much thought and ingenuity have been devoted to the modern bungalow, and many quite ornate and costly buildings upon that line have been there produced. The same remark applies to some of the more fashionable bathing resorts along the Atlantic coast, the banks of the Hudson river, etc. These are, however, the exceptional instances. The form in which the bungalow is usually presented in this country and in Europe is that of an unpretentious residence, shooting or fishing lodge or week's end rest in the country, of moderate dimensions and of inexpensive but attractive construction; one-story or two-story; sometimes with and sometimes without verandas. In all cases, however, the prominent blanket-like roof and the overhanging eaves are in evidence.

The right setting for the ideal bungalow is the country; in a garden full of sunshine and encircled by trees and shrubberies. The presumption (interpreting by all the surroundings) being that the occupants of the bungalow are easy-going, cosy, well-to-do people, having more regord for comfort than for show. The entire atmosphere is that of simplicity and hospitality.

The bungalow has, however, been modified in various directions, as already stated. The result is that there is a growing demand for residences of this kind. Nor is the demand limited to a few states, but is to be found well nigh everywhere; and in the cities and towns as well as in the country.

The explanation of this demand can be found in part at least in the fact that the bungalow, besides being externally attractive, can be built at comparatively small cost, and out of almost any kind of local material —wood, stone, brick, concrete, stucco, etc. Nor does it require much skill in the builder. Once the fundamental principles underlying this form of construction are understood, the rest is easy enough.

We present with this article cuts from photographs of two cottage-bungalows recently designed and built at Muskegon, Mich., by Messrs. Cooper & Alting, of that city.

The exterior effect of No. 1 can be gathered from consulting the elevation. This bungalow measures 40′x33′ exclusive of porch; one story, basement and attic. The departure from the original one story bungalow idea indicates that we are dealing with a city and with a country example of this kind of building. It may be as well to state here that the comparatively moderate overhang of the roof is another feature of urban (as contrasted with rural) treatment. The explanations of these departures from original type are obvious: first, the size of lot is limited; second, light is more obstructed in the city than in the country.

The material for basements is brick. The same material, finished with a cement cap, is used for the fence walls to steps and about the front porch. The chimneys are topped off in the same way. The balance of the external walls is constructed of studding covered with siding. The roof and sides of dormers are of shingles.

The pediment over the open porch is filled in with wooden posts in a kind of imitation of old-fashioned half-timber work, the intervals being made out with shingles. A broad flight of cement steps lead up to the main entrance. The bevelled plate glass introduced in the windows is an artistic touch that merits attention.

The plan of the first floor indicates the interior accommodation. Passing through a small but well lighted vestibule, we enter the living room; an apartment of generous proportions and provided with an open fireplace, which is something that is never absent from the living room of the true bungalow as we know it in these climes, ofttimes something more than merely chilly. Adjoining the living room is the dining room. The way in which these rooms are thrown together secures a fine vista-like effect, that is peculiarly appropriate to this kind of building.

The hall is well placed in the center of the building. Note the privacy thereby obtained, in giving access not only to attic, but to the bedrooms and the various offices. True, the questions of light and ventilation present themselves in connection with this arrangement, but a moment's reflection furnishes at once the answer and the remedy. Fanlights over three doors and, maybe, the top panels of kitchen door glazed, would admit ample light and considerable ventilation, which the staircase would assist mate-

Muskegon Bungalow No. 2. Cooper & Alting, Builders.

NATIONAL BUILDER DESIGN NO. 360.

For Floor Plans, Details, etc., see Supplement of this number. Estimated cost, architect's fees not included, $3,211.92.

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rially. The rear entrance gives ready approach to the kitchen, also to the basement. Altogether, the interior arrangement of this building leaves little to be desired. It is at once commodious, convenient and economical. Everything is snugly compacted together, without four rectangular walls.

Bungalow No. 2 covers an area of 26′0″x40′0″, exclusive of front porch. In this instance the basement is of concrete blocks. The veranda extends the entire width of the building.

The layout of the basement is convenient. Note the workshop to the fore; also laundry in the rear, with its clothes chute. The furnace room in center, with wood and coal handy.

Height of basement 7′0″. Height of first floor 9′0″. Height of attic 8′0″. As will be observed, additional sleeping accommodation could be secured in the attic without much difficulty if necessary.

It has been well said that the bungalow should be a low building, hugging close to the ground, also that it should have heavy overhanging eaves, casting long and deep shadows. All of this is quite true, as far as it goes, and no farther. The answer of the practical man is, the bungalow of the United States, and of the temperate zone generally is not the bungalow of East India. We have snow, often deep snows, hence the desirability of introducing a basement and of raising the first floor somewhat, at least sufficient to allow of the external doors clearing all probable snow banks. For much the same reason, the eaves of the American bungalow need not extend so far, or descend so low, as they do in countries nearer to the equator, where the sun glare is well nigh intolerable.

The American bungalow is somewhat more than a copy, it is an adaptation.

Estimate of Muskegon No. 1

By I. P. HICKS.

EXCAVATING AND MASONRY.

258 yds. excavating, 35c	$ 90.30
21,000 brick laid in wall, $13	273.00
Cement steps and caps	28.00
146 yds. cementing celler, full basement, 50c	73.00
1 fire place chimney breast, 17 ft., $2.50	42.50
12 ft. above breast, $2	24.00
39 lineal ft. kitchen flue, $1	39.00
Total excavating and masonry	$ 569.80

LUMBER BILL.

1, 8x10x10 ft. girder	67
1, 8x10x24 ft. girder	160
4, 6x6x8 ft. posts	96
10, 2x6x16 ft. box sills	160
10, 2x10x16 ft. box sills	270
68, 2x10x16 ft. floor joists	1,830
68, 2x10x18 ft., floor joists	2.024
40, 2x4x16 ft. plates	440
48, 2x4x12 ft. plates	384
160, 2x4x18 ft. partitions	1,920
42, 2x4x16 ft. partitions	462
30, 2x4x16 ft. dormers	330
12, 2x4x12 ft. porch	96
20, 2x4x12 ft. attic ceiling	160
10, 2x4x16 ft. attic ceiling	110
8, 2x6x16 ft. hip rafters	128
14, 2x6x22 ft.	308
8, 2x6x20 ft. rafters	160
8, 2x6x18 ft. rafters	144
58, 2x6x16 ft. rafters	928
30, 1x6x12 ft. braces	180
16, 1x4x12 ft. bridging	64
10, 2x8x16 ft. porch joists	210
10, 2x4x16 ft. porch ceiling	110
12, 2x4x12 ft. porch rafters	96
Total feet framing lumber	10,843
10,843 ft. framing lumber at $26	$ 281.91
1,540 ft. 8 in., No. 2 lap, rough flr., $26	40.04
1,670 ft. 10 in., No. 2 shtg., outside walls, $26	43.42
2,450 ft. 6 in., No. 2 shtg., roof, $25	61.25
25,000 Star A. Star R. C. shingles, $4	100.00
1,760 ft., 2¼ face flg., $45	79.20
600 ft. flg., $30	18.00
2,100 ft., ½x4 in. Rdw. siding, $30	63.00
5 rolls R. R. paper, 75c	3.75
900 ft. ⅝x4 in. ceiling, $30	27.00
190 ft. ⅝x4x8 ft. ceiling porch, $30	5.70
200 ft. 1x4x18 ft. flg., porch, $45.	9.00
300 lineal ft., 1x8 cypress finish, $45	9.00
80 lineal ft., 1x12 cypress finish, $45	3.60
150 lineal ft., 1x4 cypress finish, $45	2.25
6, 2x10x16 ft. cypress, No. 1, com. cellar steps, $45	7.29
12 pieces 1⅛x4x10 ft. cypress finish, $45	2.25
Total lumber bill	$ 756.66

MILL WORK.

6 porch columns, 10x10x5 ft. 6 in., $2.50	$ 15.00
290 ft. 2 in. bed mold, 1c	2.90
60 ft. quarter round, ⅞ in., ½c	.30
200 ft. ⅞ in. cove, ½c	1.00
140 ft. 2 in. water table, 1c	1.40
6 cellar windows, 12x16, 2 ft., $1.80	10.80
6 cellar sashes, 12x16, 2 lt., $1	6.00
1 grade entrance door frame, 2 ft. 8 in. x 6 ft. 8 in	2.50
1 front door frame, 2 ft. 10 in. x 6 ft. 10 in., with side lights, 12x 60	9.00
2 triple window frames, 40x40x20, center, sided windows, 20x30, $7.50	15.00
2 triple window frames, 24x24, 2 lt., $6.75	13.50
1 twin frame, 24x26	4.50
5 window frames, 24x30, $2.25	11.25
1 window frame, 20x20	2.00
2 triple frames, 24x18, $6	12.00
2 windows, 40x40x20 bev. plate	30.00
4 windows, 20x40 bev. plate	32.00
6 windows, 24x24 bev. plate	60.00
2 windows, 24x26, $2.20	4.40
5 windows, 24x30, $2.30	11.50
1 window, 20x20	2.00
6 windows, 24x18, $1.80	10.80
1 colonnade opening	35.00
1 set door jambs, 2 ft. 10 in. x 6 ft. 10 in.	1.00
4 sets door jambs, 2 ft. 8 in. x 6 ft. 8 in., 70c	2.80

6 sets door jambs, 2 ft. 6 in. x 6 ft. 8 in., 60c	3.60
2 side lights, 12x60	10.00
1 door, 2 ft. 8 in. x 6 ft. 8 in., x 1¾ in.	5.00
1 door, 2 ft. 10 in. x 6 ft. 10 in. x 1¾ in.	16.00
1 front dr., 2 ft. 10 in. x 6 ft. 10 in., 1¾ in.	18.00
4 inside drs., 2 ft. 8 in. x 6 ft. 8 in. x 1⅜ in., $2.60	10.40
6 inside drs., 2 ft. 6 in. x 6 ft. 8 in. x 1⅜ in., $2.60	15.50
52 plinth blocks, 8c	4.16
22 casings, 6 ft. windows, 132 ft., 2c	2.64
16 casings, 5 ft. windows, 80 ft., 2c	1.60
14 casings, 4 ft. windows, 56 ft., 2c	1.12
52 casings, 6 ft. doors, 312 ft., 2c.	6.24
208 ft. head casings, 2c	4.16
208 ft. cap mold, 2c	4.16
208 ft. fillet, ½c	4.16
104 ft. window stool, 2c	2.08
104 ft. apron, 2c	2.08
364 ft. window stop, ½c	1.82
234 ft. door stop, 1c	2.34
440 ft. inside base, 3c	13.20
440 ft. floor mold, ½c	2.20
300 ft. picture mold, 1½c	4.50
Stairs	30.00
Kitchen case	25.00
Bath room drawers	5.00
Total mill work	$ 488.59

CARPENTER LABOR.

10,843 ft. framing, $10	$ 108.43
5,660 ft. framing, $8	45.28
25,000 shingles, $2	50.00
1,760 ft. flooring, 2¼ face, $20	35.20
600 ft. flg., $15	9.00
Smoothing floors	27.00
2,100 ft. siding, $15	31.50
1,080 ft. ceiling, $15	16.20
200 ft. porch floor, $15	3.00
250 lineal ft. cornice, 12c	30.00
140 ft. outside base, 4c	5.60
Setting porch columns	3.00
Setting frames	12.00
45 per cent cost of mill work for finishing	219.85
Total carpenter labor	$ 596.06

RECAPITULATION.

Excavating and masonry	$ 569.80
Lumber bill	756.66
Mill work	488.59
Carpenter labor	596.06
Mantel	60.00
Hardware and nails	66.00
Tin work	40.00
Plastering 670 yds., 27c	180.90
Electric wiring	52.00
Plumbing	260.00
Painting	215.00
Heating furnace	140.00
Incidentals, 5 per cent	170.75
Total estimate	$3,585.76

Estimate of Muskegon No. 2

By I. P. HICKS.

EXCAVATING AND MASONRY.

210 yards excavating, 35c	$ 73.50
950 cubic ft. concrete wall, 25c	237.50
396 sq. ft. face of 8 in. cement block wall, 17c	67.32
975 ft. cement floor, 6c	58.50
32lineal ft. double flue chimney, $2	64.00
Cement steps	8.00
Total excavating and masonry	$ 508.82

LUMBER BILL.

	Feet.
12, 2x10x14 ft. girder	276
3, 8x8x8 ft. posts	129
33, 2x10x12 ft. first floor joists	660
33, 2x10x14 ft. first floor joists	759
10, 2x6x16 ft. sill plates	160
10, 2x10x16 ft. sill plates	270
10, 2x6x12 ft. sill plates	120
26, 2x8x14 ft. second joists	494
34, 2x8x12 ft. second joists	544
8, 2x8x16 ft. second joists	168
8, 2x8x16 ft. porch joists	168
12, 2x8x14 ft. porch joists	228
16, 2x4x14 ft. porch ceiling	144
72, 2x4x18 ft. partitions	864
32, 2x4x16 ft. partitions	352
24, 2x4x16 ft. plates	264
20, 2x4x12 ft. plates	160
50, 2x4x18 ft. rafters	600

24, 2x4x16 ft. rafters	264
26, 2x4x10 ft., collar beams	156
20, 1x6x12 ft. No. 1 com.	120
16, 1x4x12 ft. No. 1 com.	64
12, 2x2x16 ft. No. 1 com.	66
Total ft. framing lumber	7,030
7,030 ft. framing lumber at $26	$ 182.70
1,220 ft. 8 in. No. 2 lap rough fl., $26	31.72
1,550 ft. 10 in. No. 2 shtg., $26	40.30
2,000 ft. 6 in. No. 2 shtg. roof, $25	50.00
19,000 Star A. Star R. C. shingles, $4	76.00
1,900 ft. ½x4 in. rdw. siding, $30	57.00
4 rolls R. R. building paper, 75c	3.00
300 lineal ft., 1x8 cypress finish, $45	9.00
60 lineal ft., 1x10 cypress finish, $45	2.25
40 lineal ft., 1x6 cypress finish	.90
96 lineal ft., 1⅛x8x16 cypress finish	4.05
156 lineal ft. 1⅛x4x12 cypress finish	4.12
700 ft. ⅝x4 in. ceiling, $30	21.00
230 ft., 1x4x8 ft. flg., porch	10.35
40 ft., 1x4x16 ft. flg., porch	1.80
220 ft. ⅝x4x14 ft. ceiling, porch, $30	6.60
40 ft. ⅝x4x16 ft. ceiling, porch, $30	1.20
3 pieces, 1⅛x12x12 ft. cypress finish	2.02
3 pieces, 1⅛x12x16 ft. cypress finish	2.70
120 lineal ft., 1x4x16 ft. cypress finish	1.80
120 lineal ft., 1x6 W. P. com.	2.10
1,400 ft. flg., first floor, 2¼ face, $45	63.00
650 ft. flg., second floor, $30	19.50
Total lumber bill	$ 593.11

MILL WORK.

132 ft., 2 in. water table, 1c	$ 1.32
300 ft., 2 in. bed mold, 1c	3.00
150 ft., 3¼ in. crown mold, 2c	3.00
60 ft., ⅞ in. quarter round, ½c	.30
80 ft. ⅞ in. cove mold, ½c	.40
8, 8x8x6 ft. porch col., $2.50	20.00
2 half col.	2.70
2 porch col., 6x6x7 ft., $2	4.00
72, 2x2x20 in. cypress balusters, 5c	3.60
13 cellar frames, 12x16, 2 lt., $1.80	23.40
1 cellar frame, 12x16, 1 lt.	1.70
13 cellar sash, 12x16, 2 lt., $1.20	15.60
1 cellar sash, 12x16, 1 ft.	.80
1 grade entrance dr. frame, 3 ft. 0 in. x 6 ft. 8 in.	2.40
2 inside cellar frames, 3 ft. 0 in. x 6 ft. 8 in., $2	4.00
5 inside cellar frames, 2 ft. 6 in. x 6 ft. 8 in., $2	10.00
1 front door frame, 2 ft. 10 in. x 6 ft. 8 in.; side lights, 12x60 in.	10.00
1 rear outside dr. frame, 2 ft. 8 in. x 6 ft. 8 in.	2.25
2 win. frames, 40x44x20, $2.50	5.00
1 triple frame, 40x44x20; center, sides, 18x32	6.75
1 twin frame, 24x32, 2 lt.	4.50
1 twin frame, 24x26, 2 lt.	4.50
1 frame, 30x32, 2 lt.	2.25
2 frames, 24x32, 2 lt., $2.25	4.50
1 frame, 16x20, 2 lt.	2.00
2 sash frames, 16x20, 1 lt., $1.75	3.50
2 triple dormer frames, 24x16, 2 lt., $6	12.00
1 gable frame, 8x8, 6 lt.	1.50
1 twin frame, 8x8, 4 lt.	3.00
1 window, 40x44x20, leaded	8.00
2 windows, 18x32, leaded, $3.50	7.00
2 windows, 40x44x20, plain	12.00
4 windows, 24x32, 2 lt., $2.25	9.00
2 windows, 24x26, 2 lt., $2	4.00
1 window, 30x32, 2 lt.	2.50
1 window, 16x20, 2 lt.	1.80
2 sashes, 16x20, 1 lt., $1	2.00
6 windows, 24x16, 2 lt., $2	12.00
1 sash, 8x8, 6 lt.	1.80
2 sashes, 8x8, 4 lt., $1.50	3.00
1 grade entrance door, 3 ft. 0 in. x 6 ft. 8 in. x 1¾	4.50
2 cellar doors, 3 ft. 0 in. x 6 ft. 8 in., 1¾, $4	8.00
5 cellar doors, 2 ft. 6 in. x 6 ft. 8 in., 1⅜, $2	10.00
1 front door, 2 ft. 10 in. x 6 ft. 8 in., 1¾	16.00
2 side lights, 12x60, leaded, $3.50	7.00
1 rear O. S. dr., 2 ft. 8 in. x 6 ft. 8 in., 1¾ in.	7.00
11 inside drs., 2 ft. 6 in. x 6 ft. 8 in., 1⅜ in., $2.60	28.60
2 inside drs., 2 ft. 8 in. x 6 ft. 8 in., 1⅜, $2.70	5.40
1 inside dr., 2 ft. 0 in. x 6 ft. 0 in., 1⅜ in.	2.25
1 inside dr., 2 ft. 10 in. x 6 ft. 8 in., 81¾ in.	4.00
11 sets dr. jambs, 2 ft. 6 in. x 6 ft. 8 in., 80c	8.80
2 sets dr. jambs, 2 ft. 8 in. x 6 ft. 8 in., 90c	1.80

1 set dr. jambs, 2 ft. 0 in. x 6 ft. 0 in.	.60
1 set dr. jambs, 2 ft. 10 in. x 6 ft. 8 in.	.80
68 plinth blocks, 6c	4.08
WINDOW CASINGS.	
20 pieces, 6 ft., 2c	$ 2.40
8 pieces, 5 ft., 2c	.80
2 pieces, 2 ft., 2c	.08
12 pieces, 3½ ft., 2c	.84
DOOR CASINGS.	
68 pieces, 6 ft., 2c	$ 8.16
220 lineal ft., head casing 2c	4.40
220 lineal ft. cap mold, 2c	4.40
220 lineal ft. fillet, ½c	1.10
84 lineal ft. window stool, 2c	1.68
84 lineal ft. apron, 2c	1.68
300 ft. window stops, 14 ft., ½c	1.50
310 ft. door stops, 14 ft., 1c	3.10
440 ft. base, 3c	13.20
440 ft. floor mold, ½c	2.20
168 ft. picture mold, 1½c	2.52
4 thresholds, 15c	.60
Main stairs	35.00
Cellar stairs	10.00
Kitchen cupboard	25.00
China cupboard	10.00
Total mill work	$ 468.56
CARPENTER LABOR.	
7,030 ft. framing lumber at $8	$ 56.24
4,770 ft. sheathing, $10	47.70
19,000 shingles, $2	38.00
1,900 ft. siding, $15	28.50
1,000 ft. ceiling, $15	15.00
260 ft. porch flr., $15	3.90
132 ft. outside base, 4c	5.28
250 lineal ft. cornice, 12c	30.00
Porch steps	4.00
Porch rail	8.00
Setting columns	5.00
Setting 50 frames, 25c	12.50
Finishing 14 cellar windows, $1.25	17.50
Finishing 7 cellar doors, $2	14.00
1 grade entrance door	4.00
1 front door and side light	8.00
1 rear O. S. door	3.50
1 double acting door	4.00
15 inside doors, $3	45.00
24 windows, $2	48.00
440 ft. inside base, 5c	22.00
168 ft. picture mold, 1½c	2.52
Stairs	20.00
Cellar stairs	8.00
Kitchen cupboard	15.00
China closet	9.00
Clothes chute	6.00
Closets, 2	3.00
1,400 ft. flooring, $20	28.00
650 ft. flooring, $15	9.75
Smoothing floors	25.00
Total carpenter labor	$ 543.39
RECAPITULATION.	
Excavating and masonry	$ 508.82
Lumber bill	593.11
Mill work	468.56
Carpenter labor	543.39
Hardware and nails	80.00
Tin work	20.00
Plastering 530 yds., 27c	143.10
Plumbing	320.00
Electric wiring	48.00
Painting	209.00
Heating furnace	135.00
Incidentals, 5 per cent	152.94
Total estimate	$3,211.92

There are approximately 22,880 cubic feet within the walls of the building, making the cost of construction about 14 cents per cubic foot.

JUST KEEP ON KEEPIN' ON.

If the day looks kinder gloomy,
  And your chances kinder slim;
If the situation's puzzlin';
  An' the prospect's awful grim;
And perplexities keep pressin'
  Till all hope is nearly gone,
Just bristle up and grit your teeth,
  And keep on keepin' on.

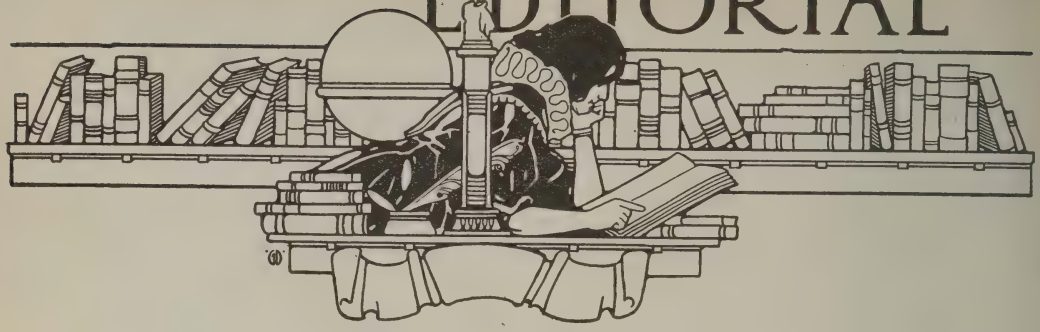
Fuming never wins a fight,
  And frettin' never pays;
There ain't no good in broodin' in
  These pessimistic ways.

Smile just kinder cheerfully,
  When hope is nearly gone,
And bristle up and grit your teeth,
  And keep on keepin' on.

There ain't no use in growlin',
  And grumblin' all the time;
When music's ringing everywhere,
  And everything's a rhyme.
Just keep on smiling cheerfully,
  If hope is nearly gone,
And bristle up and grit your teeth,
And keep on keepin' on.

—**Exchange.**

EDITORIAL



Now is the time to renew your subscription to the NATIONAL BUILDER for 1913.

* * *

It is well enough to wait for it if you have to, but we find by experience you get it quicker, and more of it, if you go for it.

* * *

Renew early so that your name will be entered on our books for 1913 before the present year expires. Do not wait until the number for January is issued, or you may not be able to get a copy, and your files will not be complete.

* * *

By waiting until it comes to you, is all very well if it cannot be obtained otherwise, but remember you may be neither a bird nor a fishbait, but it is the hustling flyer that chases and catches the early wiggler.

* * *

"A carpenter is known by his chips," and the poorer the workman the greater the heap of chips—and waste material. A good workman "maketh few chips," and fewer blunders and mistakes, and is seldom hurried into bad work.

* * *

"Never put off until tomorrow, what you can do today," may be an evidence of wisdom and industry, but sometimes after eating too much newly made green-apple pie, Tommie has come to the conclusion that it is safer to put off some things until tomorrow.

* * *

Tests made by Prof. R. C. Carpenter of Cornell University show that the sun-power steam engine, using steam of about one pound above atmospheric pressure and a vacuum of twenty-eight inches, requred about thirty-one and six-tenths pounds of steam per horse-power per hour. This engine has been fully described in the columns of some of the scientific journals.

* * *

Garden suburb experiments have also been begun at Mannheim and Stettin on land leased by co-partnership tenants on favorable terms from the municipal corporations. Several of the states of Germany have sold land to garden city associations at a considerably lower price than they would have accepted from speculators, and a beginning has been made in developing big estates that have been thus acquired at Carlsruhe and Nuremberg. The most notable of the new German garden suburbs is now being built at Leipsic. The municipal corporation of Leipsic has contributed $500,000 of the capital needed for the garden suburb. The fever also has invaded England, where many places have been worked up towards garden city ideals, such as the Hampstead Garden Suburb, a rural retreat for urban workers, and like Letchworth, a place with an industrial life of its own. It now contains 300 houses, two factories, and a restaurant and institute which afford abundant facilities for social recreation.

* * *

On another page we have something to say on the new Equitable building, which is now contemplated to occupy the site of the old building destroyed by fire on the 9th of January last. The plans and specifications of the new building, it is said, will be the last word in business buildings in New York. The ground floor will be occupied by magnificent arcades, shops, broad marble staircases, and a battery of express lifts running to the twentieth floor without a stop. Simplicity and dignity have been sought in the exterior plans. The detail and feeling of the Italian Renaissance characterize the design, and the

materials used will be a harmonious combination of stone, brick and terra cotta. The Equitable Life Insurance Company will occupy one whole floor of the new structure, while the Lawyers' Club of New York will occupy the whole of the top floor. The building when completed will be the grandest and most perfect business structure of its kind in existence.

* * *

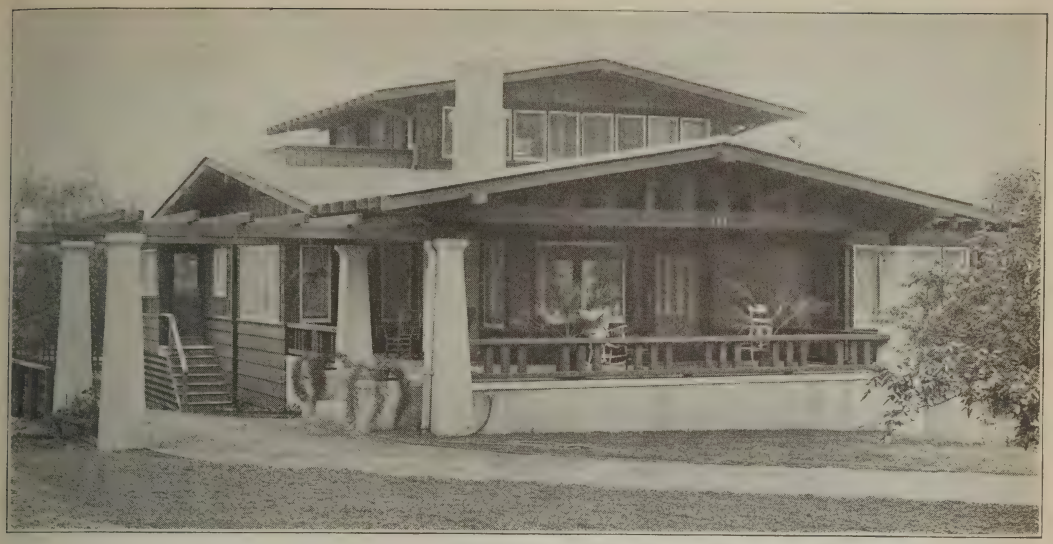
One of the oldest museums in the world, if not the oldest, is stationed in the city of Nara, the former capital of Japan. Since its foundation in 759, it went through all the changes of the Japanese empire without one single addition to its collection. Dr. Otto Kummel is one of the few Europeans who were permitted to visit the museum. It opens its doors but once a year, on a day in spring, when a special committee inspects the collection, and a new list is made out. The museum contains about 3,000 articles, which are said to be the most beautiful specimens of decorative work which have ever been produced by human hand; such as lacquer ware, decorative furniture, enamel ware, cambric-like fabric, etc. The origin of the majority of the articles is uncertain; some came from China and others from Corea, but most of them appear to be of a more exotic origin. All, however, came of a time prior to the year 756.

* * *

The agitation for more artistic towns and villages—and cities too—goes on apace, and one can scarcely take up a paper or a magazine that has not something to say or to suggest on this line. Some weeks ago Herr Langdon, secretary of the Berlin City Town Planning Exhibition Association, delivered a lecture in London on the subject of health and art in towns, villages and cities, and among other things he remarked: "That Germany had for some time suffered from various diseases in town planning matters. First there was the diagonal disease, the bacillus of which was found to be that of the straight line, and subsequently the worm disease, as a result of which streets were built in such wavy curves as almost to cause dizziness to the pedestrian. This was followed by the open space disease. Every one of these diseases had at some time or other been awarded a first prize. They in Germany had, however, overcome these diseases very well, though they still had relapses at times. They had learned not to sacrifice too much to æstheticism, and that they could not yet afford to disregard the style of common sense." Further, he said, "No well-fitting garment could be made unless the measurements were taken from the body, and so in town planning, they had to consider the requirements and habits of the town's inhabitants. They must collect and compare the experiences of large and small towns in all parts of the country in regard to railways, markets, schools, open spaces, and municipal associations. In addition they must have a uniform way of administration, and must create a technical, scientific phraseology of town planning. They hoped to form a center or permanent exhibition of town planning, where would be collected all the important improvements within their range, and where every local administrative authority could seek advice regarding those questions upon whose solution the welfare of the population depended." He also gave the names of a number of towns and suburbs in Germany where experiments have been tried on these lines and are in a measure successful.

Sleeping Porch of Arthur G. Nason, Architect, Among the Pines and Eucalyptus of the Berkeley Hills.

Showing Open Sleeping Porch of Residence in Rock Ridge Place. Overlooking Berkeley, the Bay and San Francisco.



Los Angeles Bungalow with Second Story Open Air Sleeping Apartments.

Outdoor Sleeping Porches

By HORATIO F. STOLL.

A FEATURE which has been generally adopted by all modern California house builders, whether the house contains five or twenty-five rooms, is the sleeping porch or outdoor sleeping room.

Curiously enough, we are only just beginning to find out how good and useful a thing air is. As a matter of fact, as one authority points out, it is the most important of all, for we can not do without it for even a minute. Deprive us of air for one minute and we are in torture; in five minutes we are unconscious, and in ten minutes, dead. But partial asphyxiation is a slower process. We close houses in winter to keep warm and in summer to keep cool, and we survive the process. But we are gradually learning that boxed-up air, even fairly pure, is not refreshing, and that it easily becomes very dangerous with confinement.

Once acquire the habit of sleeping out and you will wonder how you are going to be satisfied again with the close atmosphere of a stuffy room. There are children in California who have slept out of doors in all weathers every night since they were born, and are the better for it. Those who have not enjoyed this luxury, should try sleeping out during the warm season. They will forget what it is to "catch cold," and will arise in the morning feeling thoroughly refreshed. What is more, they will be surprised to find that the summer nights hold many charming surprises which they have probably missed.

I had this fact impressed upon me recently when I stopped at St. Helena and put up at St. Godard's Inn for the night. The inn is built on a knoll in the midst of a redwood grove and overlooks the picturesque Napa Valley, one of California's best-known dry wine grape sections. To my surprise, the manager showed us several rooms on the second floor fitted with French windows that allow guests to step out onto roomy porches used for sleeping purposes. The night was warm, so I was delighted to have a chance to sleep out doors, for in our flat in San Francisco, we have no such facilities, although our doors and windows are always wide open.

Generally speaking, I am not an ardent advocate of couches, but I found the one on which I rested very comfortably indeed. This fact probably helped to put me in a particu-

larly receptive mood, for before long I was conscious of the aromatic scents of the trees and flowers and was enjoying the soothing silence of the night. Presently I also realized that the sky was particularly beautiful and that the general illumination of the heavens far surpassed the efforts of any painters that had ever dabbled in starlight. There were millions of twinklers, the milky way was bright and the great luminaries seemed to stand out like huge lanterns. It was a brave display, and I could not help pitying those who were sleeping indoors and missing the wonderful sight.

Years ago, Robert Louis Stevenson, in search of health, spent some months as a squatter in this beautiful valley and in commenting on just such a wonderful night, he said: "He who has seen the sea commoved with a great hurricane thinks of it very differently from him who has seen it only in a calm. And the difference between a calm and a hurricane is not greatly more striking than that between the ordinary face of night and the splendor that shone upon us. The nameless color of the sky, the hues of the star fire, and the incredible projection of the stars themselves, starting from their orbits, so that the eye seemed to distinguish their positions in the hollow of space—these were things that we had never seen before and shall never see again."

Twenty-five or thirty years ago, the tent room was the best excuse for outdoor sleeping, but most people have found the sleeping porch far preferable. At first such porches as a house possessed were pressed into service and adapted to this new use, Japanese screen curtains being let down in the day time to conceal the evidences of habitation. Now, however, the sleeping porch has become a regular institution, and is as carefully planned for as the living room or kitchen. In many instances, its number has been increased to correspond with the number of the family so that it is not uncommon in California to find a house with three or four such porches, each capable of accomodating two white single iron bedsteads.

In the hot interior sections of California, where there is no rain from the first of June until September, sleeping quarters are often located on the roof, or take the place of small second-story courts that do not face the East. This part of the house is avoided, because those who sleep out-doors are not anxious to be awakened too early by the rising sun.

In sections where the heat is not intense, and where the sleeping porch is roofed and screened, the morning sun is by no means objectionable.

In the garden of the Hotel Raymond, at Pasadena, there is a rose-embowered bungalow built upon the side of the hill overlooking the golf links. At the east end of the house, where the lot slopes off abruptly, is a small lanai and from this was extended, for about twelve feet, a narrow uncovered hallway or gallery, connecting with a large, double, outdoor sleeping apartment whose foundation timbers, extending from the bottom of the hill, make it a regular second-story apartment while still on the level with the lower floor of the bungalow home. A hallway divides the apartment in two, the sides of which are of wire screenings with transoms above. The gables are long and the roof built in such a way that in rainy weather no rain can drip into the rooms. The free circulation of air beneath the floor of the apartments is a good feature which many sleeping porches do not possess.

In Los Angeles, I saw a novel covered sleeping apartment which topped a pretty bungalow that was also distinctive for its sun parlor and pergola entrance. In fact, it looked as if the owner's sole thought in building was to get every ray of sunshine in the day time and as much fresh air as possible during the night.

For rainy weather, his family had a large bedroom, with windows running about the four sides. The windows, by the way, were the kind that swing in or out instead of slide, this being a method which enables them to open entire instead of but half way. During the warm summer days they were able to use two open sleeping porches, which could be reached from either side of the sheltered apartment. An iron framework covered each, so that in case it was desired to put on an awning, this could readily be done.

There is no doubt, however, that the screened porch or apartment is the most practical and popular, for it affords a certain amount of privacy, is a protection where there are children who might climb on the dangerous railing and fall overboard, and above all, keeps out the objectionable mosquito, which, alas and alack, is also found in many sections of California.

Lounging Room of Sanitarium in the Heart of San Francisco.

Interior of a Sleeping Porch Which May Be Used as a Sun Parlor.

Kitchen and Pantry Fixtures

By CHARLES P. RAWSON.

WE have devoted all our space this month to the detailing of several kitchen fixtures. The kitchen, its arrangement and general requirements have received far less attention at the hands of house designers than their importance deserves, and even now a great many kitchens are entirely unsuited for convenient use. An architect, in order to properly plan a kitchen and its connecting pantries, if any are to be provided, must necessarily know the scale of the work to be performed in it and whether or not it is to be done with servants. In large houses much space must be devoted to serving purposes and many more cupboards and cases are required than in the more modest house.

In the smaller and usual house, the kitchen should be so planned that the work may be easily and conveniently performed by the mistress of the house. In this class of home, it is getting to be more and more the custom to do without pantries or with only one small one for storage purposes only, and to have the kitchen itself contain all the cases and cupboards required for kitchen utensils, cutlery, china, food-stuffs, etc. At the same time the kitchen should be no larger than the scale of work for which it is intended absolutely requires and it must be a convenient and thoroughly comfortable room with plenty of light and air and direct sunlight if possible.

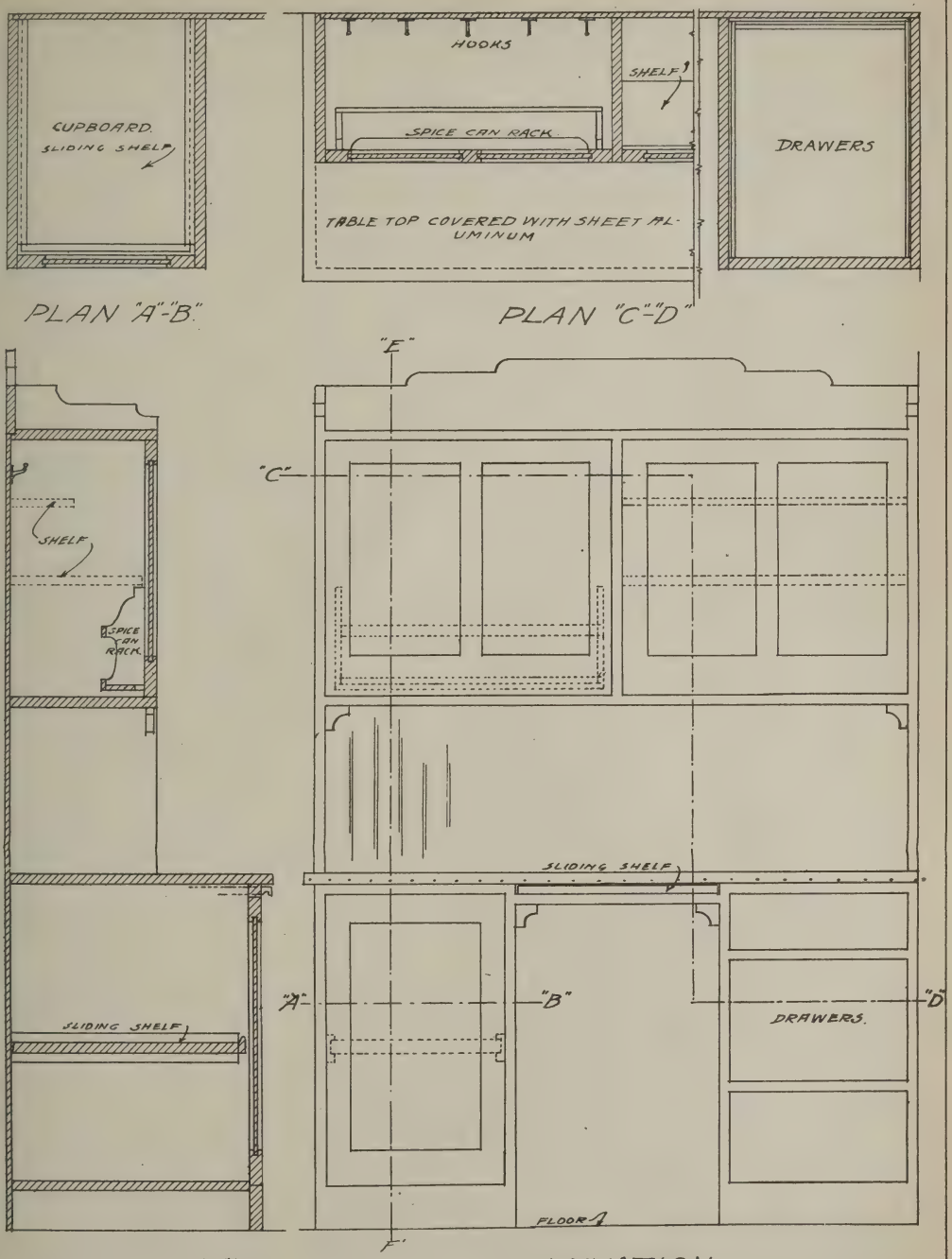
The fixtures and their arrangements must be of a nature to help rather than retard the work and all kitchen finish should be of a sanitary nature. A plastered wainscot about four feet high, either plain or marked by vertical beads twelve inches apart and finished with a low base at the bottom and a chair-rail at the top, make the best economical finish. This wainscoting should be enameled in some suitable tint and the plastered walls above it and the ceiling should be painted and stippled in order that they may be easily cleaned. All woodwork should be close-grained and either painted or finished natural without polish. The floors may be either of white maple, oiled, or pine with a covering of linoleum. Tile floors for kitchens are not recommended. A floor made of a plastic composition laid on a wood lining is coming into use and makes a very desirable floor. It is made in a variety of colors.

We recommend that all cases be lined at the back with 3/8" of 5/8" beaded stuff. Shelves may be either adjustable or fixed in place as the housekeeper may desire, but they are usually fixed in place. In one of the cases, two tilting flour-bins are shown, one of them being divided into two compartments. It will be noted that they are balanced on pivots, so placed that the bin will easily close and so that it can readily be lifted out for cleaning. Details for the pivots are given. Both bins are placed behind hinged doors as an additional precaution against dust.

The cabinet shown provides room for all necessary supplies and utensils used in cooking, and its effectiveness is added to by sliding shelves, kneading-board, can-rack, etc. This can-rack and the shelves give ample room for spices, soda, baking powder, etc., and hooks at the back are convenient for egg-beaters, graters, mixing spoons, etc. An office stool should be placed in front of this cabinet. The top of the cabinet table is covered with sheet aluminum, the best material known for table covering, as it is easy to keep clean and bright, does not tarnish or corrode like zinc, chip like glass, or stain like marble. Two feet and eight inches is a good height for the table part of cabinets and cupboards, but they may be made as low as two feet and six inches or as high as three feet.

A conveniently placed refrigerator should be provided adjacent to, but not in the kitchen, and should always have an outside icing door. A closet for brooms, and dust pan, and a clothes chute to the laundry and a rack for table leaves are helpful additions to any kitchen.

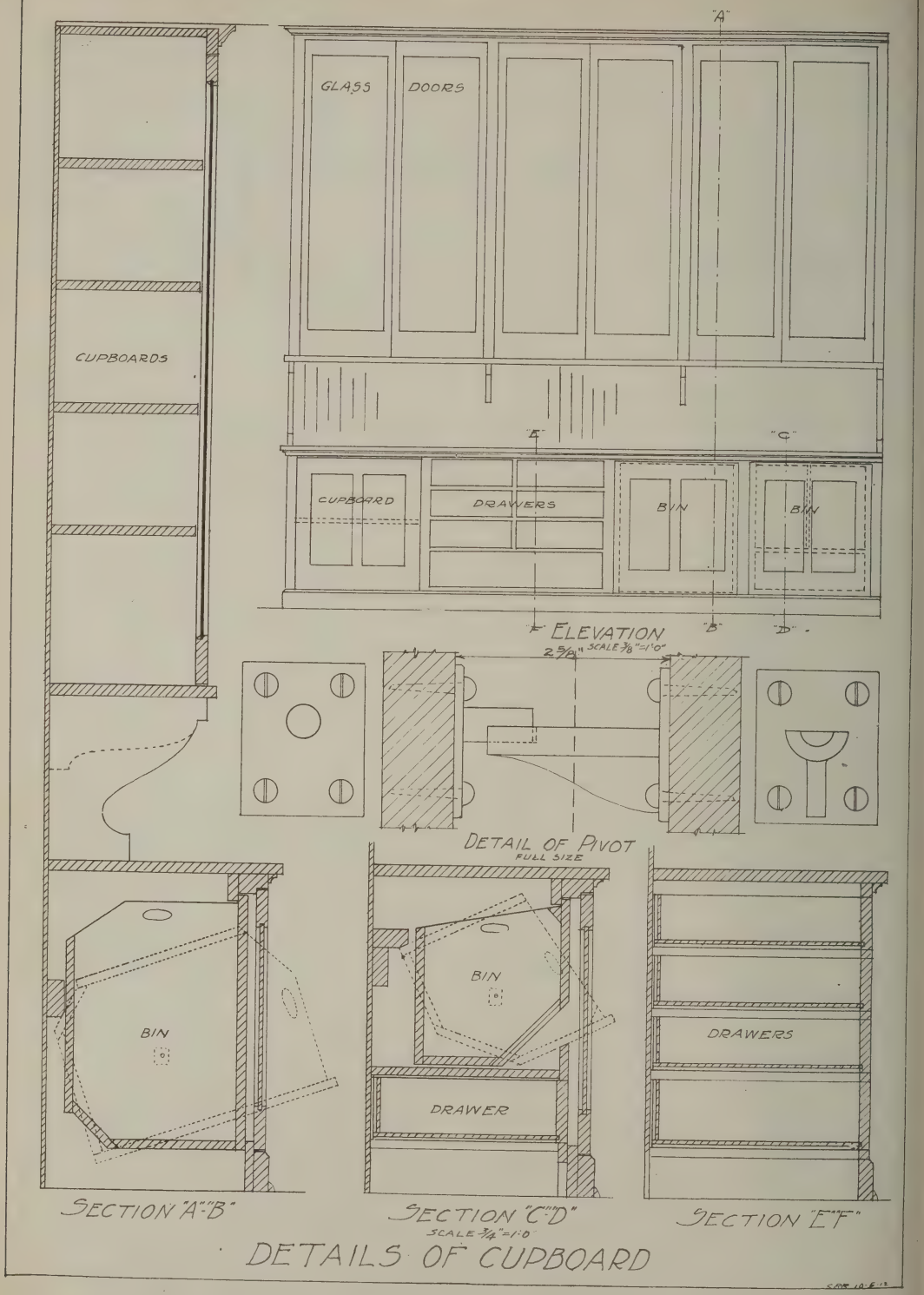
There is no reason why at least every new house should not have the kitchen and its accessories as nearly ideal as possible and these suggestions are given in order that each housewife who is planning a new home may benefit thereby and be relieved of needless work owing to the inconvenient arrangement of her kitchen.



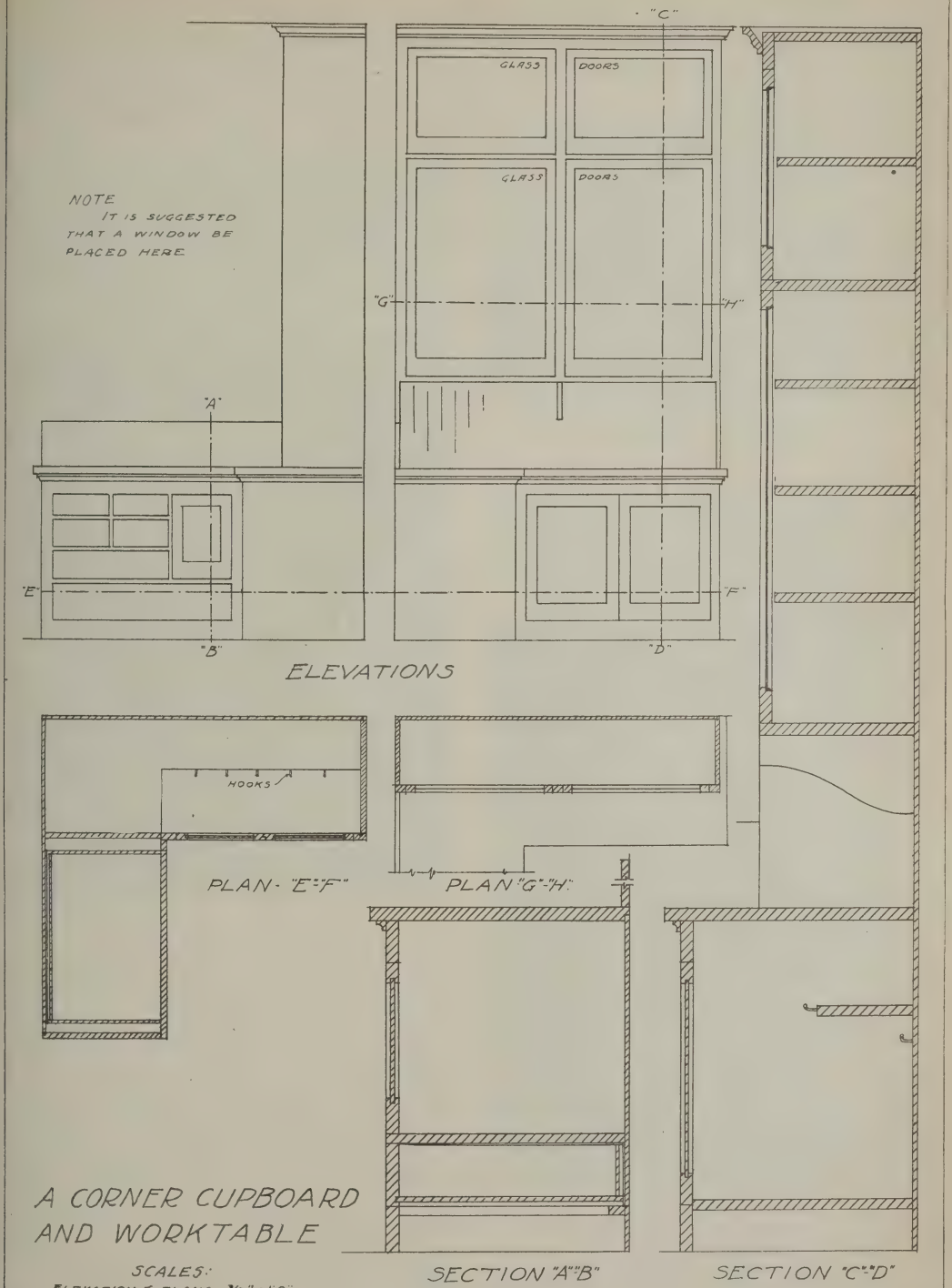
BUILT-IN KITCHEN CABINET

SCALE: 3/4"=1'-0"

C.P.R. 10-10-13

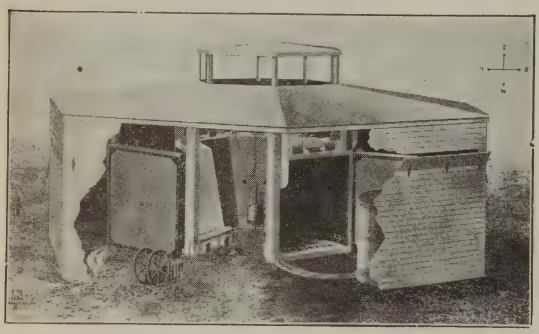


DETAILS OF CUPBOARD


"C"
GLASS
DOORS
GLASS
DOORS
NOTE
IT IS SUGGESTED
THAT A WINDOW BE
PLACED HERE
"G"
"H"
"A"
"E"
"F"
"B"
"D"
ELEVATIONS
HOOKS
PLAN "E"-"F"
PLAN "G"-"H"
A CORNER CUPBOARD
AND WORKTABLE
SCALES:
ELEVATION & PLANS - 3/8" = 1'-0"
SECTIONS 3/4" = 1'-0"
SECTION "A"-"B"
SECTION "C"-"D"
C.F.R. 10-12-12

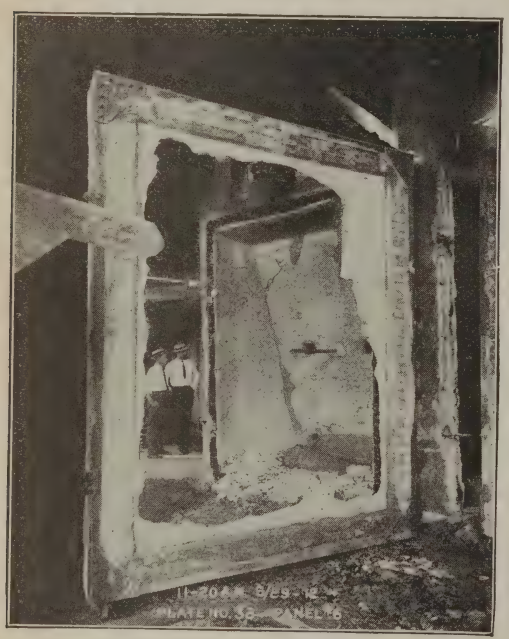
Saving Space and Weight in Buildings

Last June the Cleveland Building Department tested six partitions in a laboratory specially constructed to determine their relative fire-resisting value.



No. 1. The Test House.

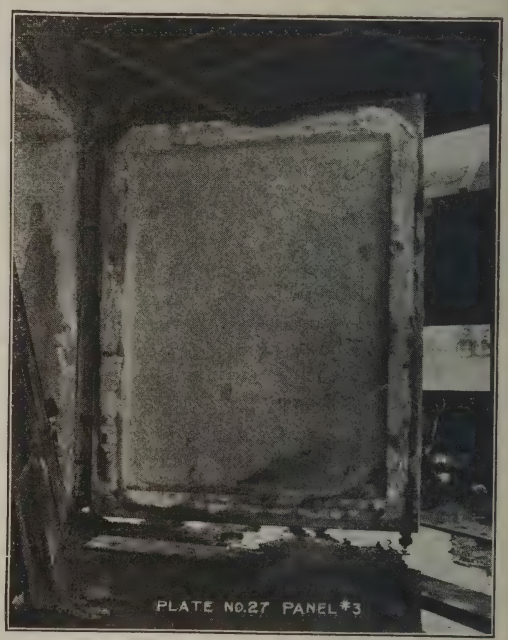
City Building Inspector, V. D. Allen, appointed the following committee to conduct the test: Professor John H. Nelson of Case School of Applied Science, Mr. L. H. Miller of the Bethlehem Steel Company, and Mr.



No. 2. Plaster Board.

William S. Lougee, a prominent architect of Cleveland. The following types were constructed for the test: Panel No. 1.—Metal lath on wood studding. Panel No. 2.—Wood lath on wood studding. Panel No. 3—2″ solid metal lath on metal studding. Panel No. 4.—Stucco wall—metal lath on wood studding. Panel No. 5—4″ hollow metal lath on metal studding. Panel No. 6.—Plasterboard on wood studding.

The committee in preparation of the report to be made to Mr. Allen are making a thorough analysis of the data developed and because of the exhaustive study being given it, the report will be delayed. In anticipation of the official report, some



No. 3. Solid Metal Lath.

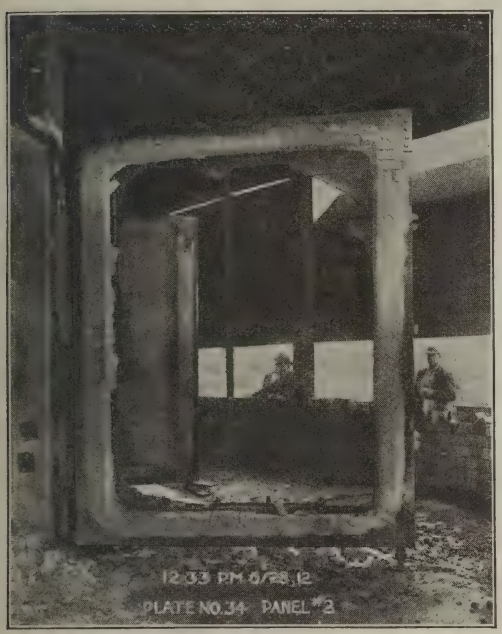
knowledge of the performance of certain of the partitions under fire and water will be of particular interest to builders and owners of buildings.

Panel No. 1 was given two hours' fire, the last 90 minutes at a temperature ranging from 1,700 to 1,912 degrees Fahrenheit, the first 30 minutes being required to bring the temperature up to 1,700 degrees. Water from the city hydrant was then thrown against the hot wall through a 1⅛″ nozzle with the result shown in the view marked Plate 25 (Cut No. 5).

Panel No. 2 was treated in the same way, the maximum temperature being 1,865 de-

grees. Plate 34 (Cut No. 4) shows a total destruction of this wall.

Panel No. 3, 2″ solid metal lath, was fired for two hours, also, the highest temperature recorded being 1,929 degrees. Plate 27 (Cut No. 3) illustrates a striking example of fire and water resistance.



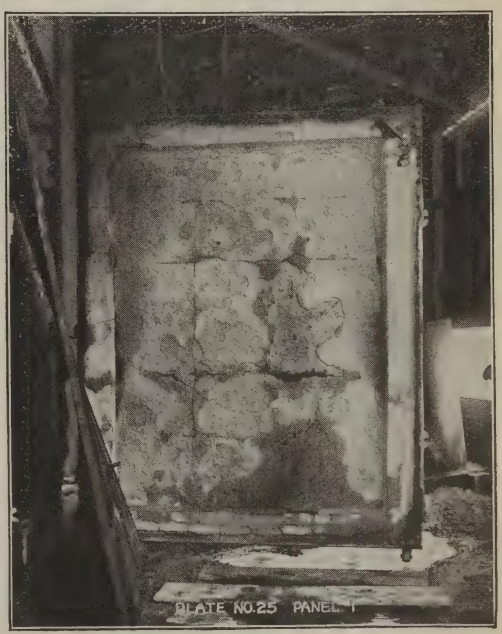
No. 4. Wood Lath on Wood Studding.

Panel No. 6—plasterboard—was fired for 74 minutes, the maximum temperature being 1,562 degrees, with the result shown by Plate 38 (Cut No. 2).

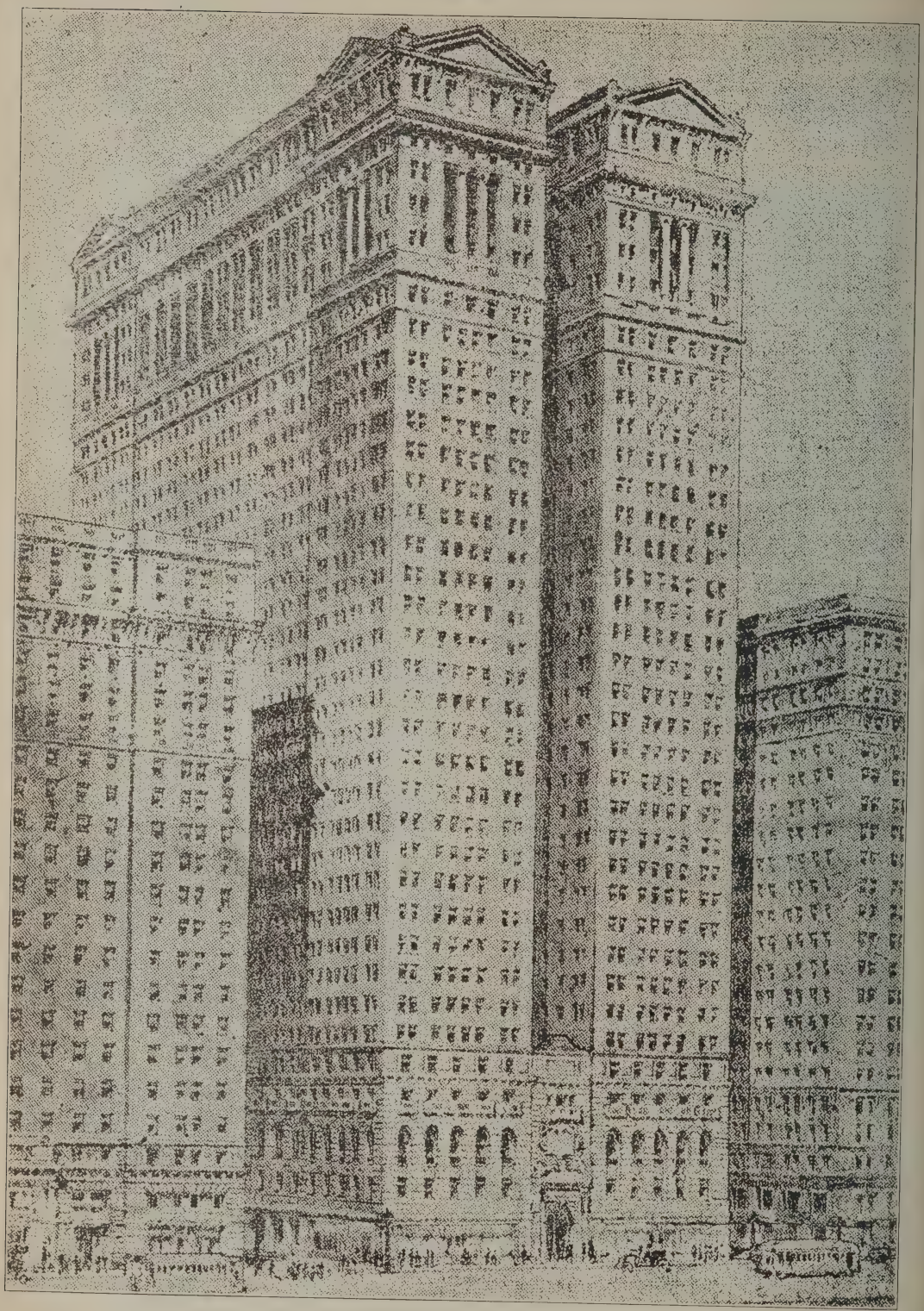
A comparison of these results draws the attention of a builder to the 2″ solid metal lath partition, not only because of its ability to withstand such severe abuse, but on account of the great economy of space and saving of weight by its use. A block partition when plastered is about six inches thick; the solid type of metal lath and stud partition is, roughly speaking, two inches thick. Thus, in comparison, there are four inches added to each dimension of each room by building the 2″ partition. Each three lineal feet of partition saves one square foot of floor space. If this space is rented at $1.25 per square foot, per year,, it will pay for the partition in twenty months. Suppose the average room is 10′x12′ or 120 sq. ft. and with a 2″ wall, 10′4″x12′4″ or 127.4 sq. ft. This increases the rentable space and consequently the gross income on the building by over six per cent. It means a greater percentage of increase in net earnings and is, easily, enough to make the difference between a profitable and a losing investment.

In the comparison of weight, we may say that the six-inch wall will not weigh over thirty-eight pounds per square foot plastered, while the 2″ partition will weigh 18 lbs. to the square foot at the most, thus making a very material reduction in the live and dead load and a corresponding saving in the total cost of the steel framework and foundations.

These savings in space and weight so readily convertible into profits are not always given the consideration they should. Coupled with the advantages of fire-retarding construction and the rapidly rising land values in all communities where there is much building, there is much in this that should be given to the architect for his analysis and portrayal of relations.



No. 5. Metal Lath on Wood Studding.



Approved Design for the New Equitable Building.

The Equitable Building

THE big fire of last January in New York, which destroyed the old Equitable building on Broadway, seems to have been quite opportune, as the enlargement, removal, or the entire rebuilding and reorganizing of the whole structure in the near future had been decided upon. Plans had been prepared for a new and much larger building to be placed on the site of the old one, at a cost of twenty-eight millions of dollars. It is to be the largest office building in existence, and will have 1,350,000 square feet of rental space and for the space tenants will pay as high as $30 a square foot a year. Everything about it will be on a greater and grander plan than anything ever undertaken. It is planned purposely to excel the world in construction and to set a limit which shall not be surpassed in many years, and will have an earning capacity of $2,500,000 a year. The structure will be thirty-six stories high above the curb, rising to a height of 475 feet. Below the ground there will be several more floors to a depth of 50 feet. Full walls will be erected on Cedar and Pine streets, but on the Broadway and Nassau street sides the elevation is to be broken above the fifth story by deep courts running back almost to the center of the block, from which the elevator shafts, the corridors and the inside offices will get their light and air.

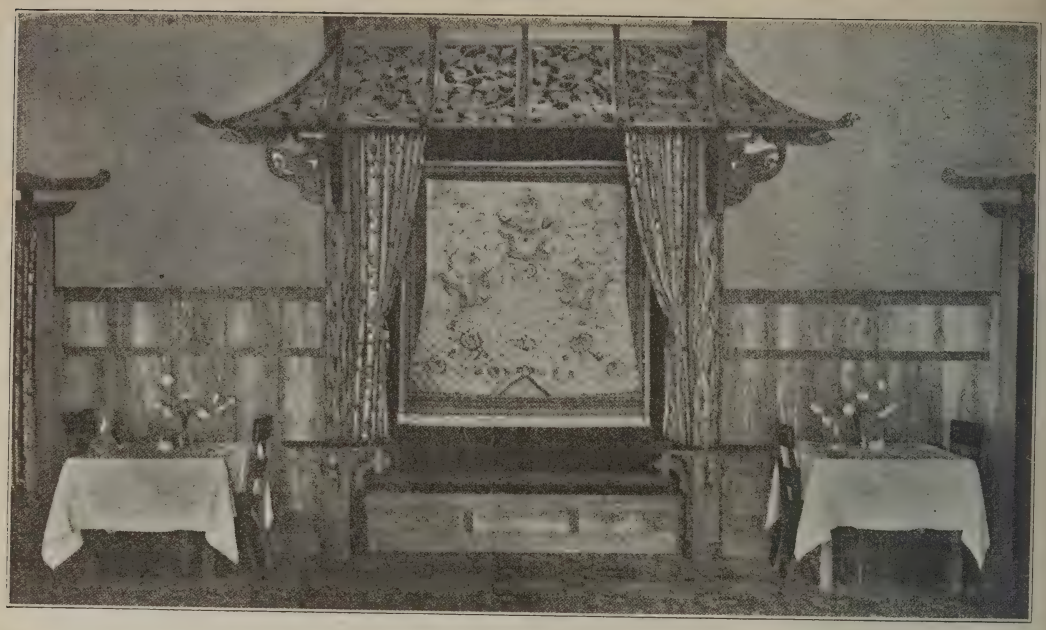
No great ornamentation has been attempted in the exterior of the building, but rather a simple and dignified design in the Italian Renaissance, with materials of stone, tapestry brick and terra cotta in soft tones. It will be known as the Equitable building.

Sugi Finish and Its Uses.

A GREAT deal of the charm pertaining to certain Japanese forms of decoration lies in the fidelity with which native processes are followed in the producing of distinctive effects, says a writer in a recent number of The Upholsterer.

In our reference to Japanese interiors on different occasions, as well as to Japanese furniture of various types, mention has been made of the effective treatment of wood to obtain what is called "sugi" finish. Sugi wood in Japan is a favored material for interior work and somewhat resembles our cedar. The old wood dug from swamps, poetically known as "Sugi of God's Age," is highly prized for its beauty, and it is the peculiar grain and soft finish effects characteristic of this wood that give rise to the term sugi finish. Sugi finish in this country is an effect produced by the action of heat on cypress wood, and we believe that to John S. Bradstreet, the Minneapolis decorator, a great deal of the credit for its introduction in this country is due. The idea came to Mr. Bradstreet that by scorching certain varieties of wood it would not only be possible to raise the grain, but to give a weathered effect for interior finish, and although beautiful results were obtained with some of other varieties of wood, it was only with cypress that all conditions necessary to success were found to exist. This was accounted for by the fact that cypress is practically the only wood which does not contain pitch or rosin which would cause it to flame when intense heat was applied.

The process is very simple. The lumber must first of all be bone dry, preferably not over five eighths of an inch thick, although good results have been obtained on heavier lumber, and in the case of paneling the finish is applied to the wood before it is put in position. The boards are so placed that they are easy of access, and the flame of a painter's gasoline torch is slowly passed across the face of the board, forward and back, as shown in our illustration, Fig. 1, until the whole surface is blackened. The board is then set aside for at least forty-eight hours to recover from the warping which takes place during the burning. Next the surface of the board is rubbed with an ordinary steel-wire brush, as shown in Fig. 2, until the charred portion is removed and

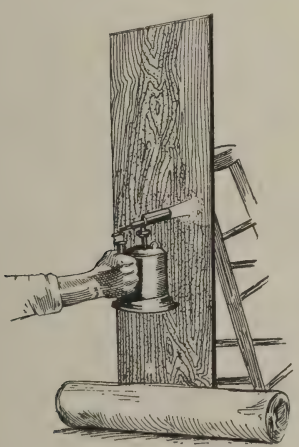


Sidewall of a Japanese Tea Room, Showing Sugi Finish Wainscot.

While sugi finish is particularly appropriate for Japanese interiors, there is no reason why it cannot be used effectively for modern treatments which wood finish predominates. In the above illustration the wainscot, the beaming, the mantel and the plate rail, together with the door and window frames, could all be treated in sugi finish and be in perfect accord with the auxiliary furnishings.

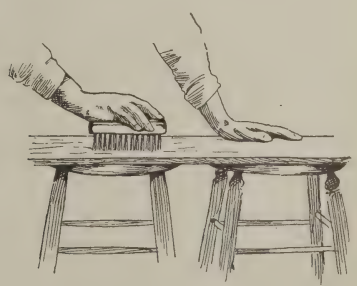
the grain brought into prominence, the heat having charred the soft summer growth and merely colored the hard grain of the winter wood. By the removal of the entire charred portion the grain of the wood is thrown into considerable relief, the coloring varying from the almost black appearance of the hard growth to a light tan, according to the depth of the rubbing. The rubbing may be lengthwise or across the grain; the deeper the rubbing goes, the lighter the effect and the greater contrast will be. Finally the brown dust is removed with a dry bristle brush or a scrubbing brush. If a glossy surface is desired, a light coat of floor wax may be applied, but varnish should not be used, as the result is not pleasing.

Sugi Finished Cypress, Natural Size.



No. 1. Burning the Wood.

Various color effects can be produced by following up the sugi process with the application of a stain or pigment. A suggestion for the use of the latter is found in the old Japanese carvings, which retain traces of a chalky paint in pastel tints. Floral designs are painted by the Japanese in pastel tints of greens, pink and blue on panels in sugi finish. For such work the contrast in



No. 2. Rubbing Out the Wood.

the grain is kept very moderate, the whole surface having a rich brown color. This appearance can be secured by applying a coat of "flat" white lead paint and wiping it off immediately from the high parts of the grain with a handful of cheese cloth.

For interiors the figure of the wood is brought out in so pronounced a manner by the sugi finish that the wall covering used in connection with woodwork of this character should be very quiet, either a neat diaper pattern of solid color or a plain weave, while draperies and upholstery of short-pile velours are effective with it. A soft, golden-tan color, a warm gray, or a jade green would combine well with this wood and the more usual rich red, green or dark blue, will also prove satisfactory.

The simplicity of the process and the fact that the boards best suited for this finish are those which have a slightly raised grain and are in consequence undesirable for ordinary work, make this finish economical. In the selection of lumber "checks" and "splits" must be avoided, but the heart sap or blue stain is not objectionable.

Calcimine and Other Water Paints

By A. ASHMUN KELLY.

CALCIMINE, or kalsomine, as you prefer, has been in favor for interior decorating for many years, the writer having used it when the only coating of the kind was mixed "on the job," from finest gilder's whiting, white glue and boiling water, without any coloring, that being unthought of then. This mixture was applied hot, and at first, or as far back as I can remember, only for ceilings, and those only of the parlor. For an extra white job white zinc was used instead of whiting. It had but one rival in its line, and that was whitewash.

Today water paint is used inside and outside alike, and on walls and ceilings alike. Also, it is colored in as many ways as oil paints are. Very little is home-made, the commercial article being fully as economical to use, and surer to give the desired results, as a rule.

There are two ways of mixing prepared calcimines, one with hot water, the other with cold, but there is no difference in the result, as the calcimine is prepared either to be dissolved with hot or cold water respectively. But the best decorative effect is obtained by allowing the calcimine to stand until cool, when it becomes jelled; in this condition it has better body and one coat is sufficient for a good job. Indeed, it is always better to apply one coat rather than two, the surface being in proper condition for coating. And in spreading the paint do not lay it off as oil paint is laid, but criss-cross it, using the tips of the brush for this purpose. A very close view will show this slight roughness, but at the ordinary range the effect will be what is known as solid, and well covered. This applies to all calcimines and all shades and white.

Interior water paint needs only good glue as a binder, but exterior water paint must be made upon an entirely different base, casein usually being employed as the binder. As might be expected, water paint has not given the best results on exterior work, certainly not as compared with oil paint.

Calcimine may be applied to rough inside walls with fine effect, as well as to the smooth plaster walls, and also it may be used over old or soiled ingrain paper. This is often done, particularly when it is not desired to remove the old paper—a job indeed, and for this purpose the calcimine should be made quite thin, no sizing being necessary, and two coats or one will do. One coat will allow the paper to retain some of its original appearance, especially if tinted to match the paper's color, while two coats will make the work look more like a calcimine job. And ingrain paper may be very neatly imitated on the bare walls with calcimine; this is done by grounding the wall with a light colored calcimine, and when it has become dry apply a darker coat and stipple it up and down carefully. There are many

ways in which calcimine may be employed in producing pleasing decorative effects, and the curious or interested should consult that very complete work on the subject, The Expert Calciminer, which costs a dollar, by mail, and can be ordered through The National Builder.

Certainly nothing could better satisfy the artistic sense from an interior decorative point of view than a nicely calcimined room, walls and ceiling done in proper colors or tints. Then there is the stencilling, which may be either simple or more or less elaborate, as desired, and always with charming effect. The color used for this purpose is mixed with japan gold size, the color being ground in turpentine; such color will not run on or stain the water color. There are several ways of getting fine stencil effects, but space forbids more than their mention here. Calcimine may also be varnished over, by sizing the calcimine with gelatin glue, applied cold. Rough stippling is done with a prepared "rough stuff," or thick water paint. This is mixed from whiting, plaster of Paris and glue size, and after the walls have been coated with it you run a steel comb over it, or you can make a comb out of hard wood, making the teeth as far apart as you wish, and about one-fourth inch long. This is called combed work, and when done neatly, gives a very fine effect. Plain stippling may be done with one coat of water paint or calcimine if the wall is good, using a stippling brush for the purpose. Another nice effect may be had by using a block of wood, placing it on the wet coating and raising it up, the wood drawing the coating up into a rough form. Or walls and ceiling may be done plain, and a frieze made by the stippling process.

While it is possible to apply calcimine with a whitewash or flat wall paint brush, yet the brush made for the purpose will give better satisfaction. One with long Russia bristles and about six inches wide is suitable, though for sand finished wall a heavier brush should be used, the German style being best. The care of the brush merits some attention here. Never use it in whitewash. Ordinary calcimine is not hard on the brush, but many water paints are. Such as, for instance, those water paints containing ammonia or lime. Likewise plaster base paints are hard, and the brush should be carefully washed out in cold water when done with. Never wash out in hot or even warm water. Never allow the brush to stand in the calcimine. When done with it, wash out and hang up in a cool place. This will keep bristles straight and allow them to dry out not too fast. If the brush has not been used for some time, let it soak in cold water for an hour before using. Then be sure to get out all the water before using it, or the water will run down the handle and also affect the calcimine.

There is an advantage in using calcimine that is not often mentioned in its praise, namely, that any fairly good surface may be coated with it without sizing, which must be done when oil paint or paper is the covering. Rough sand finish walls may be calcimined by simply applying a coat to the finish, no size being necessary, and one coat of the calcimine will give a fine effect. Calcimine or water paint is a cheap paint as compared with either oil paint or wall paper, the materials employed in its making being usually whiting, worth two or three cents per pound, glue, its costliest ingredient, at about 20 cents per pound, and water, costing practically nothing. If coloring is used, a very little is sufficient, a tint only being desired. Yet the limits of calcimine may be set. For instance, it will not give a very good effect if used on a rough wall, rough from broken plaster or whitewash. The best thing in this or similar cases is wall paper, which will make a very rough surface look smooth and solid when properly done. Nor will calcimine do on a damp or wet wall. Even walls in rooms not supposed to be damp, as where the room is more or less closed or not well ventilated, the calcimine will lose its binder and chalk off. True, such walls may be sized to make them proof against regular dampness, but the effect of air containing some moisture, as in a closed room or in summer (warm air always containing more moisture than cold air), is to cause deterioration of the calcimine. So that it is not advised under the circumstances. A calcimine with a plaster base, such for instance as Alabastine, would prove more durable under such conditions, but would finally perish, no doubt. Alabastine, I am informed, is bound with a casein glue, in which case the calcimine would be ever so much more durable than ordinary glue-bound whiting calcimine.

How To Handle The Retailer

By BEN F. COBB.

THERE have been a great many articles written on the subject of how to handle the customer, but I have never seen one yet on how to handle the retailer, and I think it a subject well worthy of any writer's pen. To commence with, let me say that the best way to handle a retailer is to be fair, and if the one you are doing business with does not appreciate fair treatment, then hunt up another dealer.

Some one may ask what I mean by fair treatment, and say they think the treatment usually comes from the other side, but that is not so, for there are two sides to every question and most assuredly there is to this one, and while I am going to tell you at first what you can do to assist the dealer and help yourself at the same time, I am going to tell you a few things from time to time that will benefit yourself and keep an unscrupulous dealer from taking advantage of you.

If you are at all times trying to play sharp with the dealer he will always be trying to get back at you, and you may depend upon it that the dealer has more time to think up sharp tricks than does the busy contractor. One of the greatest annoyances to the retailer of lumber is the habit some carpenters have of returning material not used.

There are two classes of carpenters that return lumber to the dealer. One is the man who orders as near as he can to the amount he expects to use, takes good care of the lumber and returns an average lot as to quality.

The other man is the one who orders more than he is likely to use and orders it with the idea of picking out the best and returning what he does not need. This man takes no care of the lumber while he has it, and what he returns is not worth half price.

In many towns where the dealers have enough confidence in each other they have an agreement that for all lumber returned, only one-half of the original price shall be allowed, but there are many places where the dealers do not have this kind of an agreement, and the returning of the surplus lumber is a constant source of annoyance to them. The carpenter who returns the poorest of the stock when he has given it no care certainly gets the best of the dealer on that particular trade if he is allowed one-half price for it, but does he get the best of the dealer in the long run; how about your customers?

How about old man Titewad who you did that job for last spring? He beat you down to the lowest possible penny and then when you came to do the work he put some more work on you that did not belong to the job, and you did it and did not come out even. You knew what a mean tongue he had and you did not want any trouble.

But haven't you been watching ever since to get even, and how about that job you did for him three weeks ago? You just caught him napping and charged him double, and your conscience reached around and slapped you on the back and told you you were a good fellow.

The lumber dealer has the same kind of a conscience that you have, and if you don't play fair with him he will be watching for an opening. He cannot get back in the same way that you got back at Mr. Titewad, but if you have studied human nature much, especially in lumber dealers, you have found that your credit is not gauged altogether by your ability to pay, and your willingness to pay, but that while your willingness and ability are both essential, the dealer will also take into consideration how you have handled him in the past.

If you have been inclined to find fault without reason, order more stock than you knew was required, so as to use the best and send back the poorest; claimed shortage in count when you could not prove it, or any other little meannesses, all those points are taken into consideration when the dealer figures the next bill for you. Therefore, from the standpoint of policy, it is best to deal fairly with the man you buy of.

There is another side of this. You have reason to expect fair treatment from the dealer, and I am sorry to say the carpenter does not always get it, but he is more apt to get it if he "totes" fair. In the meantime the carpenter should inform himself as much as possible in regard to the lumber

business; in fact, he should inform himself as to business generally, so that he may stand shoulder to shoulder with other business men.

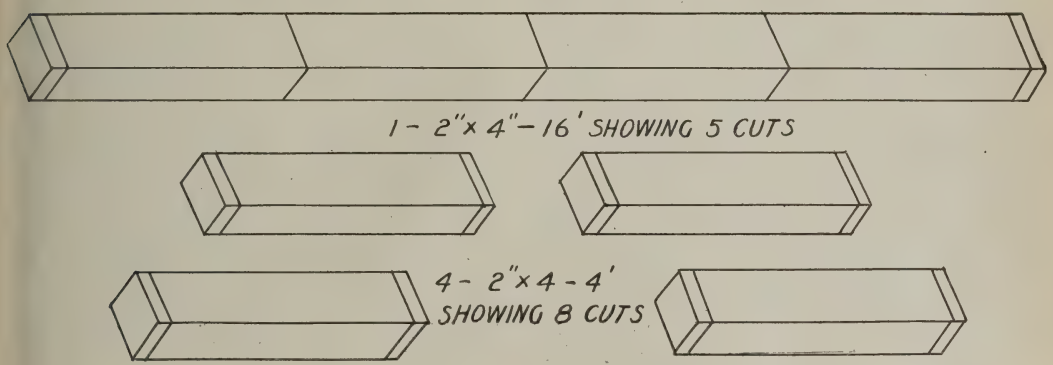
The most successful contracting carpenter is the one who buys to the best advantage, and uses whatever he buys to the best advantage. When I speak of buying to the best advantage I mean everything that the carpenter buys; lumber, as well as other building material of all kinds, and labor also, for although the carpenter often fails to consider the hiring of men as buying labor that is exactly what hiring men amounts to.

There is a chance to save a little money in buying short lengths of lumber, but there are lots of retail lumbermen who do not pay any attention to the possibilities in assisting their customers, and that is the reason why the carpenter should know about these things. He should also know how shorts happen to be made and what the relative difference in price should be. Still further he should know how much more it costs him to use shorts than it does to use long lengths. All this in regard to cost can be figured out. As for the reason of shorts, that is easily told.

It is only within recent years that the lumber manufacturer has come to mixing short lengths with long ones. It was the retailers' fault that this was brought about, and it happened in this way: The carpenter would want four pieces of 2x4, each four feet long, and he would tell the lumber dealer he wanted one piece sixteen feet long. The dealer would ask no questions, but would deliver to the carpenter whatever he asked for. The carpenter might want 10,000 feet of 2x3 bridging that had to be cut two feet, three inches long. He would figure that he could get seven pieces out of a sixteen foot piece.

To illustrate we will take a common 2x4 and will suppose the carpenter wants to use a lot of four foot lengths. The accompanying illustration is not drawn to a scale, but we will assume the longest piece is sixteen feet long and that the stock is to be used in four foot lengths, squared at each end. The sixteen foot piece shows that it must be cut five times.

We will say that the dealer has a lot of shorts, each piece four feet long, or an inch or so longer. The illustration shows four pieces, each four feet long, and it will be noticed that it requires eight cuts when the short pieces are used. We will allow one minute for every two cuts. Ninety-one pieces of 2x4x16' would make 1,001 feet, board measure, marked eleven feet to the piece, as it usually is in the lumber yards, or if figured accurately, they would make 966⅔ feet, but either way it is near enough to the 1,000 feet, board measure, for my purpose.



If the ninety-one pieces of 2x4x16' were cut into four foot lengths, and each end squared, it would require four hundred and fifty-five cuts, but if the four foot pieces, the dealer's shorts, were used it would require seven hundred and twenty-eight cuts, or an excess of two hundred and seventy-three cuts. Allowing one minute for each two cuts would give 136½ minutes, or a little over two hours and a quarter.

Now, we will suppose you pay the man who does this work $3.00 for eight hours' work. This would make the stock cost you about 85 cents a thousand for using the shorts. Suppose you paid the man $5.00 for eight hours' work. The extra cost for

using shorts would then be about $1.42 a thousand.

In most markets anything is called a short that is less than ten feet long, unless it is something like end matched flooring or wainscoting or siding that is ready to use without sawing, and the dealer buys what is known as shorts anywhere from $5.00 to $8.00 a thousand less than he pays for regular lengths. As a rule, however, he is not anxious to handle shorts for the reason that the carpenter usually objects to bothering with them, for one thing, and another reason is that it costs a little more to handle them.

I made my example on 2x4 stock, because it was the first thing I thought of, but the rule applies to any other size. It is to the interest of the carpenter to look for shorts every time he has a chance to use them, and if he is a good buyer, he can buy them for from $3.00 to $5.00 a thousand less than he would have to pay for the same grades in regular lengths.

The point in this is, if he can buy shorts for $4.00 a thousand less, and it only costs him a dollar more to use them, he is saving $3.00 a thousand on every thousand feet of lumber he can use, and in this day and age the man who wins is the one who watches the corners.

Shorts are one of the trials of the lumber manufacturer. There is no softer, clearer pine that ever grew than can be found in the trees that have an abundance of rotten knots, and often the larger portion of a log will go into lumber less than twelve feet long, or shorts.

Demand and supply regulates the price of all commodities and there has never been demand enough created for shorts but what the manufacturer is always glad to shave the price.

It looks to me as though this was the carpenter's opportunity. Of course, it requires a little figuring, and perhaps a little bother. Your men will not like it so well, but it is only a little prejudice, and you want to remember that your men are not paying your bills.

The man you hire can often give you pointers about advanced ideas in doing work, and any man who hires men and does not learn from them is losing golden opportunities. Almost every man you hire is better at some one kind of work than anything else. He may have learned what he knows from some one he has worked with, or for, but he has the knowledge and he can impart that information to you and not know that he is doing it.

Speaking of help, I was talking a short time ago with a successful carpenter who commenced with a jack plane and a hand saw, and I asked him how he managed to get along so fast. "It is a long story," said the carpenter, "but I will tell you one point, and it is a big one, and I will reserve the story for the next time I see you. One of my main points of success is the people who work for me."

"But that is no different from any other head carpenter or builder. You all depend on help, Mr. Holebrook."

"Well, then, perhaps I have stated the case wrong. If so, I will start differently and will put it this way: A good share of my success in business is due to the men I have worked."

Mr. Holebrook is something of a joker, but he has made a success in business, and as he gave me a good insight into the causes for his success I have decided to make it the subject for another article, for the ideas are of real value.

Building Contracts

By W. J. STANTON.

WHERE the contract fails to specify the manner in which the work shall be done, there is an implied agreement that it shall be performed by the contractor in a proper and workmanlike manner, and performance in such manner is not excused by the fact that the contractor is incapable, or that the compensation is inadequate. It has been held that if it is not practicable to do the work in a proper and workmanlike manner, it is the duty of the contractor to inform the builder of such fact, otherwise the impracticability is no excuse. Thus, where the contractor agrees to build a structure to be

used for a particular purpose there is an implied agreement on his part that the structure when completed will be serviceable for the purpose intended.

Where the contract expressly provides that the work shall be done in such manner as to accomplish a certain result, the risk of accomplishing such result is on the contractor. Where the contractor is to perform the work with materials, etc., furnished by the builder, he does not assume the responsibility for the fitness of the materials so as to render him liable to defects in the work due to defective material, and where the contractor is to use certain work already done by the builder, he is not responsible for defects in such manner. Thus, where a sub-contractor contracts to complete a work partly constructed by the contractor, the contractor impliedly warrants that the work done by him has been done in a proper and workmanlike manner. So, the contractor is not responsible for defects arising by doing the work in a manner directed by the builder. Where a structure is erected by several contractors, each having an independent contract with the builder, one of such contractors is not liable for defects due to the default or failure of another contractor to properly perform his work.

A contractor who agrees to perform certain work according to plans and specifications furnished by the builder is not responsible for defects due to defects in the plans and specifications. Where a contract required the contractor to furnish all labor and material, and make watertight a room beneath the surface "in the manner and under the conditions prescribed and set forth in the annexed specifications, which are hereby made a part of the contract," it was held that the contractor was not to be deemed a guarantor of the efficiency of the plans and specifications to produce the result desired, and that his contract was performed if he furnished the materials and did the work according to the plans and specifications, and thus made the room as watertight as the plans and the specifications permitted.

Where the contract merely requires the contractor to perform the work according to certain plans and specifications, it is not necessary, of course, in case the work is so performed that it also be performed to the satisfaction of the builder. Building contracts, however, frequently provide that the work shall be performed to the satisfaction of the builder. Such a provision is generally construed as not making the builder's declaration of dissatisfaction conclusive, but as requiring the performance of the work by the contractor in such a manner as ought to reasonably satisfy the builder. Thus, a contract to install a heating plant in a manner satisfactory to the owner of the building has been merely to require the installation of the plant in such a manner as should reasonably satisfy the owner, and not permit the owner to express dissatisfaction as a matter of mere caprice; and the same has been held true with regard to a contract to do the polishing of the woodwork of a building to the satisfaction of the builder.

In the absence of any provision in the contract requiring it, it is not necessary, in order for the contractor to show a performance of the contract, to show that the work has been approved or accepted by the architect, engineer or superintendent employed by the builder to supervise it. Working contracts, however, frequently provide that the work shall be performed subject to the approval of an architect, engineer, or superintendent employed by the builder and that the right of the contractor to recover the compensation shall be subject to such approval. Such provisions are universally recognized as binding upon the parties, and the necessity for complaints with them applies equally to a proceeding in equity as an action at law.

It has been held that a provision in the contract for the payment of the compensation in installments as the work progresses upon a certificate from the architect or engineer that the work has been done in accordance with the terms of the contract does not require a certificate as a condition precedent to the final payment. Where the builder completes the work, in pursuance to a provision therefore in the contract, the cost of completion to be deducted from the amount to be paid to the contractor, a provision in the contract requiring a certificate of approval from the architect or engineer in charge, is rendered inapplicable, as the object of such provision is merely to furnish to the builder when called upon to pay the contract price of the work, authentic evidence that the work to be certified has been performed.

Systematizing Form Work

Reinforced concrete contractors recognize that the cost of form work is one of the dominant factors in determining whether a given job is executed at a profit or a loss. During the last few years a number of construction companies have been investigating methods of form work with an endeavor to devise some system whereby the cost could be reduced. One of the most successful efforts in this direction has been that of the Aberthaw Construction Company., Boston, who by detailing the forms in the drafting room of their home office and by a careful routing of the material have reduced the cost of their form work 20 per cent in the last three years. Those who have been in contact with this work have called it "scientific management," but Leonard C. Wason, president of the Aberthaw Construction Company, prefers to call it "systematizing," and very aptly puts it, "We pay thinking men to think, and carpenters to saw boards."

Perhaps the very best way to illustrate their system is to consider the question of form work at the ten-story Larkin Terminal at Buffalo, N. Y. This building was erected by the Aberthaw Construction Company of Boston, while the consulting engineers were Lockwood, Greene & Co., Boston. The total quantity of form lumber used was 1,000,000 board feet. In order to understand that which follows it should be noted that this structure is 580 ft. long by 109 ft. wide, the floor space being over fourteen acres, and is bounded by Van Rensselaer, Carroll, Exchange and Hydraulic streets.

First of all, at the home office of the Aberthaw Construction Company a location plan of all beams was made. In this, similar beams were given identical numbers irrespective of location in the building itself. From this location plan form drawings in detail were made, a detail drawing being required for each different sized form, both for sides and bottoms, and the beams of different varieties of column forms were also detailed.

The system of lettering used on this work is of particular note. In order to show the exact location of each form in the building, letters were suffixed to the beam numbers. For instance, a form marked BSE18 would mean that it was for the beam side of of beam No. 18 on Exchange street. The bottom form for this same beam would have the symbol BBE18.

An additional number had to be added to the symbol in the case of the column forms as there is a variation in the height of the floors. The figure 2 prefixed to the ordinary column symbol designated that the particular form was for 2d floor columns; to illustrate, a column form with symbol 20SE19 would mean second story form column side Exchange street, while 19 is the number of column proper as specified by the original location plan.

Form details were designed complete for two stories and to each form detail was given a symbol to be stenciled on this form when made up together with the number or quantity required in the first two stories of this structure. On this same form detail the width of the form was divided into an exact number of boards which were to make up this total width of the dimensions written on the drawing. Therefore, having given the exact length of form and the width of the different boards going to make up this form, and the total number of forms required for the job, it is quite readily seen how the sum total of boards with the exact dimensions was easily summed up.

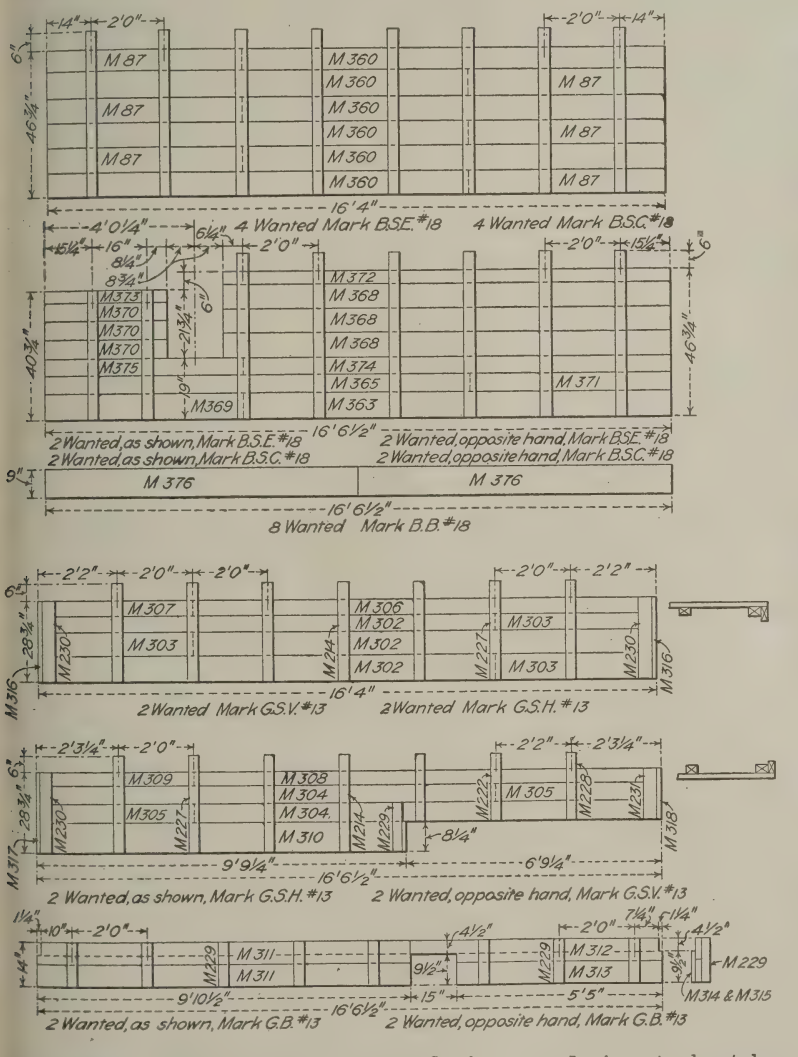
Aside from these form details, it was, of course, necessary to draw plans showing assembling of forms, the chief object of this being to specify the spacing of posts and jacks, amount of bracing, and location. From this assembly plan, together with a layout plan of the building, the exact number of pieces and size of lumber constituting the centering could be scheduled. On this completed schedule bids were obtained from the various lumber dealers before ordering the material for the job.

It was very vital that a systematic plan of piling and laying out the lumber should be adopted inasmuch as 1,000,000 board feet were used. Particular attention was given the dressed stock going to make up the forms proper since this was taken to and from the mill to the benches. The lumber was so piled that when the laborer wanted a certain number of boards of a particular size he could find them quickly for a plan was drawn showing the lumber layout and the relative location of different piles of lum-

ber according to widths and lengths. Signs were placed in front of each individual pile, stating the dimensions.

On the Larkin job the Aberthaw Company found it best to build two distinct saw mills since 90 per cent of the dressed stock had to be cut to exact lengths. Both mills had practically identical equipment but were laid out slightly different. The most used piece of machinery in these mills was a cut-off saw on either side of which was a table where the stock was placed before being cut. The other equipment consisted of a rip-saw, boring machine, planer, and emery wheel.

To illustrate the methods employed in making up a complete form from the blueprint as received from the Aberthaw Construction Co.'s Boston office it may be desirable to follow in detail a single operation. The form details, as previously mentioned, stated exactly the boards which would constitute a particular form and the number of forms required. Cards were made out at the route clerk's office stating for the labor foreman the number of pieces of stock and sizes to be taken to one of the mills. The mill men in return received orders from the route clerk stating the length to cut off the stock and if ripping was required, to what width to rip. It was the duty of the labor foreman to tag this stock according to the M number indicated on his order card. When all the stock required for a certain form had been cut and delivered to



Lumber Schedule 1st & 2nd Stories			
Wall Beam #18			
No. Pcs.	Size	Length	Mark
48	1¼"x7¾"	11'2"	M360
48	1¼"x7¾"	5'2"	M87
24	1¼"x7¾"	11'9½"	M368
8	1¼"x7¾"	11'3¼"	M363
8	1¼"x7¾"	5'3½"	M369
24	1¼"x5¾"	3'3½"	M370
8	1¼"x5¾"	11'3¼"	M365
8	1¼"x5¾"	5'3¼"	M371
8	1¼"x4½"	11'9½"	M372
8	1¼"x4½"	3'3½"	M373
8	1¼"x5½"	11'3¼"	M374
8	1¼"x5½"	5'3¼"	M375
16	1¾"x9"	8'3¼"	M376
80	2"x3"	4'4¾"	M239
16	2"x3"	3'4¾"	M240
32	2"x4"	4'4¾"	M241

Lumber Schedule 1st & 2nd Stories			
Wall Beam #13			
No. Pcs.	Size	Length	Mark
12	1¼"x7¾"	12'2"	M302
12	1¼"x7¾"	4'2"	M303
8	1¼"x7¾"	12'3¼"	M304
8	1¼"x7¼"	4'3¼"	M305
4	1¼"x5½"	12'2"	M306
4	1¼"x5½"	4'2"	M307
4	1¼"x5"	12'3¼"	M308
4	1¼"x5"	4'3¼"	M309
4	1¼"x8½"	9'9¼"	M310
8	1¾"x7"	9'10½"	M311
4	1¾"x7"	6'8"	M312
4	1¾"x7"	5'5"	M313
4	⅞"x9½"	9'10½"	M314
4	⅞"x9½"	5'5"	M315
8	1¼"x4½"	2'4¾"	M316
4	1¼"x3¾"	2'4¾"	M317
4	1¼"x3¾"	1'8½"	M318
32	2"x3"	2'10¾"	M214
8	2"x3"	2'2½"	M228
36	2"x3"	1'2"	M229
12	3"x4"	2'4¾"	M230
4	3"x4"	1'8½"	M231
12	2"x4"	2'10¾"	M227
4	2"x4"	2'2½"	M222

the proper bench, orders were issued by the route clerk to the two carpenters, who worked at the same bench, to make the number of forms required as indicated on the blueprint.

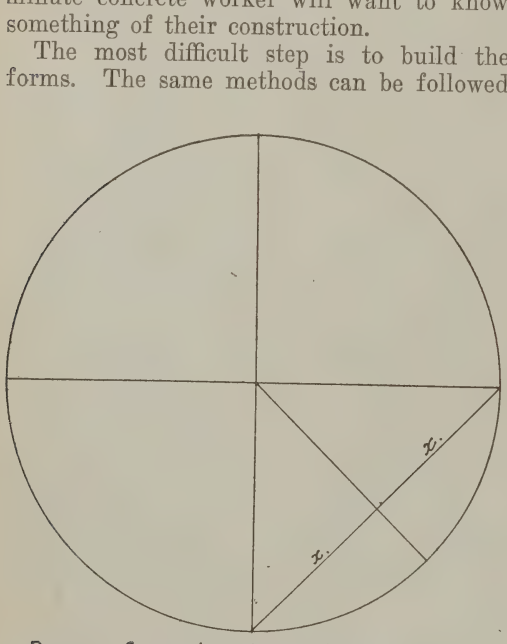
In order that the forms were made up in time to erect as planned by the office, eight benches were used with two carpenters at each bench. The carpenter having been given his orders by the route clerk telling him what lumber would be tagged to make up a certain specific form and having been given blueprint of the same form, he merely laid his stock on the bench and nailed it together. When the forms were completed a laborer oiled the same and stenciled them according to the symbols printed on the forms by the carpenters. If not required for immediate use the forms were piled systematically back of the bench at which they were made. When needed, teams carried the forms to that part of the building for which they were designed. Since it was previously determined at which point of the building the erection was to be started, a clerk was given the duty of listing forms as required for erection, and seeing that labor foreman received orders to have these forms delivered to the exact part of the building where and when needed.

Forms For Round Silo Walls

By JOHN UPTON.

AS round monolithic concrete silos are becoming more common the up-to-the-minute concrete worker will want to know something of their construction.

The most difficult step is to build the forms. The same methods can be followed



DIVIDING CIRCLE INTO EIGHT PARTS.

in building forms for foundations, for wooden tub silos and for round water tanks.

The most practical method seems to be to make segments or ribs of 2x12 plank, cover them with boards, and cover the boards with galvanized steel. This is for the inside form. The outside form can be made by the same method but a simpler way is to use only galvanized steel for the outer form.

To make the forms for an ordinary silo or foundation take sixteen pieces of 2x12 lumber. Eight for each of the two hoops. The length of these segments will depend on the diameter of the silo and are given below in a table. They should be nearly three-eighths the diameter.

The arc for the curve may be obtained by drawing with a narrow strip of board and two nails, a circle on the floor. Make the diameter two inches less than the inside measure of the ribs. For a fourteen-foot silo use a radius of sweep of six feet and eleven inches.

For foundations for tub make the circle ten inches less than the given size of the tub as a tub is measured outside to outside. We allow four inches for staves, four inches for shoulder and two inches for boards of forms.

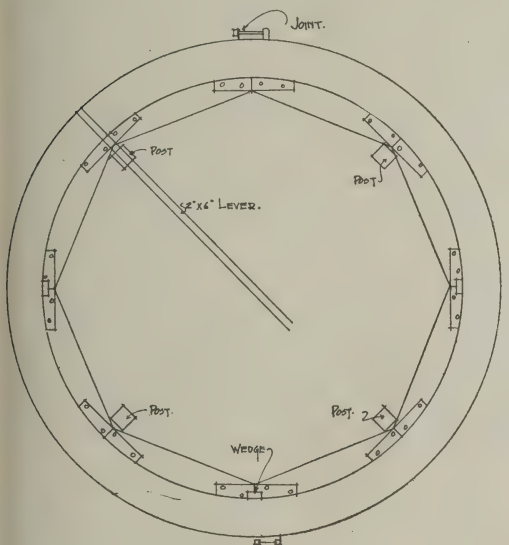
The circle as shown should be divided into eight equal parts. Their length may be found in the table below.

You may prefer to figure it out for yourself.

The diameter times 3.1416 equals the circumference. Divide this by eight, then measure on the curve and not across it. Or you can divide the actual circle into two parts, then four, then eight by using a chalk line and doing a little measuring. This will give you also the lines for cutting the ends

or mark them by the square 5 and 12, cut on 5.

To fasten these segments together you will need sixteen pieces of 2x6s 2 feet long, cut on the same circle as the longer plank. These may be nailed across the joints but if there is any likelihood that the forms will be wanted for more than one job it will be better to use bolts. They should be four and one-half inches long, one half inch in diameter; 64 will be needed, four in each



PLAN SILO WALL FORMS.

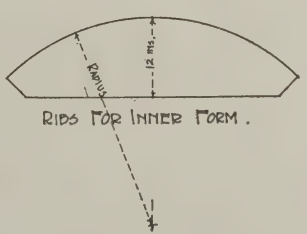
cleat. The six-inch boards are to be cut into three foot lengths and nailed to the curved edges of the ribs, placing the ribs two feet apart. The galvanized metal, 28 gauge, is nailed to the boards. The eight sections should be all alike. One end of the iron may project a few inches beyond the boards so as to lap over and make a tight joint.

To allow the forms to be raised it will be necessary to have keys to be driven in to tighten or enlarge the circle. These keys can then be driven out to loosen the form. Two will answer or four may be used. Make them of 2x4s three feet long with a slight taper. Cut a notch in the corners of the plank to make a place for them. Put the four-inch side next the boards. The outside forms will require a sufficient length of eighteen gauge metal to reach around after allowing for the thickness of the walls and give a few feet, four to six, for joints and laps. The joints are riveted, except two on opposite sides. These are made so as to be lengthened and loosened for raising the form. A very good way to do this is to rivet three strips of heavy band iron onto each end. Have the ends of these strips bent out at a right angle and use bolts ten to twelve inches long to draw the forms tight. If the forms need to be raised but two or three times it could be managed without any special device, but as silos are generally high it will probably be necessary to provide some efficient means of raising the forms and holding them up. They should be raised two and one-half feet each time allowing them to lap six inches onto the old work.

A good way to raise the forms and also to hold them in place both vertically and sideways is to erect four posts, each made of two pieces of 2x6 with blocks of the same between, leaving openings, for a lever to be put through. These posts may be spiked but can well be bolted together as they are to be used over and over. Cut two of them in half so as to break joints. At the joints put a block to take four bolts. These posts can be built up as the work proceeds. Place

RIBS FOR INNER FORMS
FORMS MADE FROM 12 INCH PLANK.

INSIDE DIAMETER	WIDTH AT END	LENGTH STRAIGHT SIDE	LENGTH CURVED SIDE	RADIUS OF CIRCLE.
10	8	3 FT. 3 INS.	3 FT. 10½ INS.	4 FT. 11 INS.
12	6¾	4 - 1½ -	4 - 7⅞ -	5 - 11 -
14	6	4 10½ -	5 - 5⅜ -	6 - 11 -
16	5	5 - 9 -	6 - 2½ -	7 - 11 -
20	3	7 - 4¾ -	7 - 9¾ -	9 - 11 -
24	2¼	9 - 7½ -	9 - 9 -	11 - 11



RIBS FOR INNER FORM.

the mat the first and third joints of each half of the ribs, close to the ribs. See plan.

These posts should be well braced across and diagonally. For levers to lift with use 2x6s. Run through the opening between the block in the middle of the posts. Bore holes and put bolts through to keep them from slipping. Then run heavy wire rope or chains from this lever down to the forms and attach to both upper and lower ribs. By

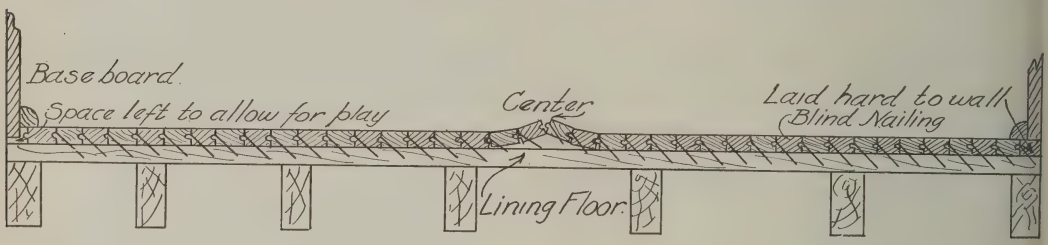
pulling down on the long end of the lever the forms may be raised to place by two or three lifts. The cross braces can be put on just under the forms to hold them up. The outer forms can be raised with the inner one.

Hardwood Flooring Troubles

THE laying of hardwood floors (kiln dried) requires a great deal more thought and mechanical skill than a great many imagine. When the carpenter has completed a nice pleasing job of floors and shortly afterward he is asked to come back; and is shown where they have raised up (see sketch), and he is told that he did not put in good stuff, his work was faulty and a hundred and one other things that he is not to blame for, it is most certainly very annoying.

What the writer proposes to discuss here is: what is the cause of this trouble, and how it may be overcome. In the first place every carpenter knows that very dry lumber is easily acted upon by dampness and he also knows that the only thing that will cause a floor to raise as shown by the sketch, is that the floor has swelled up after being laid, and that the only thing that will make it swell is dampness. Tell the average lay person that dampness has caused their floor to raise, and they will not believe you; they will say that cannot be, for there never was any water put on it, etc. I want to state right here, that it is not necessary to wash the floors with water or put any on them for them to absorb moisture enough to cause them to swell sufficient to throw them out. It will be observed that floors seldom act in this way in the winter time when there is heat in the building, but it usually happens in warm weather and after a period of wet weather when the air is full of dampness. So much for the cause.

We will now see if anything can be suggested that will in any way tend to overcome this trouble. When the carpenter is called upon to put down hardwood floors, the first thing he should study is the existing conditions. He should investigate and see if there would be any likelihood of any dampness coming up from below through the under floor. If so, either of the following preventatives may be used; the hardwood flooring may be well painted on the under side with a good waterproof paint, or a good water proof paper may be used between the floors. As soon as the floors have been laid, they should be finished on top with some reliable waterproof finish. They may be oiled with boiled linseed oil, or they may be filled with a good paste filler, then shellacked and varnished, or they may be given a wax finish. If the linseed oil is used it is better to apply it hot.



Another precaution that should not be overlooked is to allow room for the floors to work. At least a ½-in. space should be left at each wall, which would be covered up with the shoe. Then in case the floors take up a little dampness it will have room to push to the wall. It is when the floor cannot push any further that it will rise up as shown at center in the sketch.

It will also most generally be found that when a floor does rise it is about the center of the room, showing that it pushes both ways to the walls and then to the center.

Considerable ⅜-in. thick veneer flooring is being used for floors in old buildings. The writer has found by experience that the narrower the flooring the less liable to give trouble, for the reason that there is very little nailing body to this ⅜-in. stuff and you have to use a 4d or 1½-in. casing nail, and with the narrow stuff you get a better nailing surface. I am using entirely now 1½-in. wide.

Inlaying As a Decoration

LATELY we have received several letters and a number of inquiries asking for information regarding inlaying and marquetry, and the following article and illustrations by J. L. Devonstein, which are taken from "Work" are herewith given in response to these inquiries. Other articles of a similar kind will follow from time to time.

The art of inlaying consists in cutting out and laying in another shade or kind of wood. This is not a very easy operation by any means, and will require some skill and care in execution, especially in more advanced work. Yet, in the ordinary inlaying which concerns woodworkers generally, and cabinetmakers especially, the work does not present such great difficulties as some workers believe. Some of the more difficult inlaid work, in which very intricate designs are introduced, is quite beyond the ordinary woodworker, as the whole surface which is being treated is covered with a thin veneer, in which the design is worked out. This form of inlaying required very expensive tools, and often many colored woods, so that the general worker is deterred from undertaking such work himself, and passes it on to expert inlayers. In such cases a piece of veneer of the same size as the surface which is to be treated is sent to the inlayers, and is returned with the inlaid design inserted, the various pieces being held together by a piece of paper glued on the outer face. The sheet of veneer is then glued to the groundwork, and when the glue is dry, the paper is removed and the surface cleaned off.

There is no reason, however, why the woodworker should not decorate his work by the aid of simple inlaid designs. Such inlaying might be applied in almost any kind of furniture or fittings, and would greatly enhance both the value and appearance.

Figs. 1, 2 and 3 in the accompanying illustrations show three inlaid designs which would be simple to execute and would be very suitable for panels or large flat surfaces. Other simple forms of inlaying are given in Figs. 4, 5 and 6, which show the application of inlaid stringings and bandings.

Fig. 4 shows a form of stringing inlay suitable for a panel, tea-tray, or any flat surface to which such a form of decoration might be suitably applied. The outer edge in this design is inlaid with a banding about ½ in. wide; inside this is a narrower banding about ¼ in. wide, and a simple geometrical design is inlaid directly in the center.

A simple inlaid stringing for applying to the front of a drawer is shown by Fig. 5. The stringing in this case might vary in width from ¼ in. to ½ in., and should be set from ½ in. to ¾ in. in from the outer edge. Another case in which good effects are created with inlaid stringings and bandings is illustrated by Fig. 6, which shows the top portion of a cabinet in which inlaid bandings have been introduced. Many other cases in which such inlaid work might be introduced could be mentioned, but these will, no doubt, readily suggest themselves to the worker. In fact, inlaid stringings and bandings are at present being introduced in almost every kind of furnishings, especially in table tops, drawer fronts, round the edges of panels and door frames, and for the decoration of square lags and pilasters.

In the application of such inlaid designs as those illustrated by Figs. 1, 2 and 3, the designs are first set out full size on a piece of paper. The size to which the designs are set out must, of course, be governed by the size of the surface which is being treated; but the inlay should not appear to be too large or over-done. The design (Fig. 1), shown enlarged by Fig. 7, would be most suitable for a long vertical rail or panel. The enlarged design which is shown by Fig. 8 would also be very suitable for application in a similar position. Both designs are very flexible, and may be increased or diminished in length to meet almost any requirements. In the design (Fig. 7) three kinds of wood are introduced, while in that shown by Fig. 8 only two kinds are used. The designs shown (Figs. 2 and 3) are most suitable for square or oblong panels or surfaces. In that shown by Fig. 2 only two kinds of wood are used. A part of the design which is shown by Fig. 3 is shown again to an enlarged scale by Fig. 9, and three kinds of wood are employed to execute this design.

The woods used for the inlaying may vary from $\frac{1}{16}$ in. to $\frac{3}{16}$ in. in thickness, but that

FIG 1.
FIG 2
FIG 3
FIG 4
FIG 5
FIG. 6
FIG 7
FIG. 8
FIG 9
FIG 10.
FIG. 11
FIG. 12
FIG. 13

about ⅛ in. thick would be found very suitable. The woods employed should be selected with a view of forming a contrast with the groundwork which is being inlaid, and the choice will, of course, to a great extent be governed by the wood in the groundwork.

The color treatment is an important matter, and should, if possible, be obtained through the use of natural-colored woods, for those artificially stained often give very unsightly effects. The natural-colored woods most suitable for the purpose may be classed as follows: White tints are obtained with white holly, sycamore, and maple; yellow with satinwood, lancewood, canary, and light oak; red with rosewood, mahogany, and padouk; brown with dark oak, satin walnut, and birch; and for black tints ebony should be used.

Having set out the design full size on a piece of paper, the pieces of wood to make up the design are cut out to the shape required. A very fine fret-saw would be found very useful in this operation, and the shapes may be transferred from the paper pattern by means of carbon paper. The pieces are then fitted together to form the complete design, care being taken that good joints are obtained. The pieces to form the complete design are then glued directly to the paper pattern, and the edges are also glued together. Another piece of paper is then glued over the top, and the whole is cramped between two pieces of board until the glue is dry. The inlay is then removed, and the piece of paper at the back on which the design was originally marked is stripped off. The inlay is then placed in position on the groundwork, and is scribed around the edges with a marking or scribing point. The wood in the groundwork must next be cut away to a sufficient depth to receive the inlay, care being taken to work exactly to the scribed lines. The cutting is accomplished with chisels and gouges, and a router would also be found most useful in removing the surplus wood. The inlay is then glued in position, and cramped until the glue is set, when the surface is cleaned by scraping and sandpapering.

Various forms of inlaid stringings and bandings are often used; but that most commonly met with simply consists of a strip of one kind of wood. Other kinds of bandings consist of two, or even three, kinds of wood made up in geometrical patterns. The method employed to make up these kinds of bandings is illustrated in Fig. 10, which shows a banding composed of a number of oblong pieces of two kinds of wood. A number of strips are first cut and glued up edge to edge, a dark and light strip being used alternately. When the glue is dry, one edge is planed straight and square, and strips of the width required for the banding are cut from the edge as shown. To allow for the insertion of the stringings and bandings, the wood is routered away to the required depth, and they are glued into the groove and well pressed in position.

In inlaying a small geometrical design, similar to that shown by Fig. 4, to the center of a panel, the inlay should first be built up on a piece of paper as already described for the other designs; the outer edges should then be scribed round, and the wood routered away in a similar manner.

A router suitable for the purpose might be purchased from any tool merchant, but a very simple home-made tool is shown by Fig. 11. It consists of a wood stock to which a cutter and iron frame are fitted. The stock should be of beech about 2 in. wide and 1 in. deep in the center, handles being formed at each end as shown. An iron fence is shown by Fig. 12. A slot is formed in the center, and it is secured and adjusted to the stock by means of a bolt and fly-nut. It will be found advisable to provide a number of cutter blades various widths as shown by Fig. 13. The cutter passes through a slot cut in the middle of the stock, and is held in position with a wedge as shown in Fig. 11.

A Typical Bungalow, Los Angeles, Cal.

The Americanized Bungalow

E. C. M. BRANDEIS.

THE bungalow originated in India. There it is long and low, with thick walls, wide eaves, deep-set windows, and thatched or tiled roofs. It is primarily built to form shade, and give plenty of light and air, as well as a strong shelter from the extremes of heat in that country.

It was imported as a summer home, merely, to Southern California. There progressive architects seized upon its most picturesque features, and used them as ideas chiefly for exteriors of the home which corresponds in size to the cottage—from three to seven rooms. Suddenly they seemed to have discovered that they had originated a type of house which for want of a better name can be called the Americanized bungalow. Then the best known architects and builders of homes put forth their strongest efforts to so arrange the interiors of these buildings, that they would when completed be synonymous with the word "home" and they seem to have succeeded in a way past all expectation.

I do not know what one would call a "rather casual arrangement of all domestic detail." The bungalow as I know it is built with a direct effort to make the domestic arrangements so convenient as to make household work as light as may be consistent with comfort. This is a part of the effort made to simplify living in general.

First, the bungalow is adapted to its surroundings by using as much native material as possible in its structure.

In this city, there are only cobbles, which are native. They are used as trim, and as actual construction material. There are two colors, one which comes from the seashore, blue in color; the other kind are the ordinary brownish colored cobblestones, which come from the hills. There is plenty of gravel here, and more and more concrete is coming to be used in all forms of construction. Suitable materials are found almost everywhere to combine with timber which is used in practically all houses, to give the house a "native" look.

In the city of Boulder, Colorado, there is an addition almost entirely given over to adaptations of the bungalow. Here are found buildings in which foundations and pillars are formed of the rough and broken granite from the very hill on which the house stands. From glacial moraines great boulders and the smaller cobbles are taken to be used in the same way. It gets very cold at times in Boulder. Houses must be well and

substantially built for an altitude of a mile in the air. Some years since this city had a building regulation which called for an eighteen-inch foundation. The bungalows mentioned have foundations of that thickness. Nothing makeshift, or unsubstantial about that! Generally speaking the heating plant used for these houses is hot air. It works very well even in zero weather.

The architect who built this addition learned his business in California, brought all his ideas from there with him, and adapted them to the different climatic condition in such a way as to build the most admirable houses. This is Mr. E. L. Lundborg, who is now engaged in building a similar addition to the city of Fort Morgan, Colorado, where there are no native building materials. His houses have very substantial yet graceful lines. He uses some English—half timber features—on many of his exteriors, and pays very special attention to the convenience of the very complete domestic arrangements of his interiors.

It is interesting to make a study of the kinds of building from which adaptations are made to form the Americanized bungalow as we now find it. There is the Swiss chalet, with its wooden trimmings, and lines suitable for the ruggedest surroundings. The Italian villa style, with its plaster walls delicately tinted, and its chaste outlines, is some-

The Cottage Differs from the Bungalow in Appearance More Than in Plan.

times seen. The mission style, or Spanish colonial, is built around the three sides of a square very often, sometimes completely around a patio, in which grows a flower garden. For the summer home in the hills, nothing is so suitable as the log cabin, on bungalow lines, with wide eaves, clapboard roof, and rough stone chimney, puncheon floors, and home made furniture. By a very little care, and the substitution of a good heating plant of some kind, this may be made entirely complete for all round the year use. Lichen covered rock, shingles, tiles, both roof tiles and floor tiles, special kinds of brick with wide joinings, concrete, both pebble dash, ordinary plaster, and solid or poured, tim-

Moorish Design Is Cleverly Used Where the Climate Is Favorable.

bers of all kinds, any and all of these materials, and just as many more as are native in any place that it is wished to place the bungalow are entirely suitable for its construction. These materials may be used in the outlines of any and all of the styles of architecture mentioned. Combinations of several styles are possible.

If I have any fault to find with the bungalow as generally built it is the tendency often seen to use too many kinds of material in the walls of the building, thus giving a higgledy-piggledy effect very far from simplicity, and very far from the ideas of a really good architect.

The interior of the Americanized bungalow is worthy of a study. The prevailing tendency is to use craftsman finishes of all kinds. Much furniture is built into the walls of the house, and into the odd nooks and corners which are found in houses of such irregular outline. The simplest of finishes is applied to the wood used in the construction of this furniture, usually a stain, waxed. The rooms are long and low, the living and dining room are frequently divided only by pillars into the buttresses of which are built book shelves. Such an arrangement conduces

to an effect of space. The bath is placed at a convenient place, yet out of sight around a corner, so that no glimpse of it can be caught from the front part of a house. The kitchen is usually small. Everything for the kitchen is built into or onto its walls. It is planned so that the work done in it, whether for two or twenty, is reduced to the minimum. This is done by placing sink, worktable, and range within arm's length of each other, and the three close to shelves on which cooking materials are to be found. There is no reaching up or down to get cooking utensils. Where there is no butler's pantry, a sliding panel opens from the kitchen to the dining room, usually in the middle of the built-in buffet. This saves a housewife many steps.

To return to colors for interiors, the grays and greens, the dull browns, the pale yellows shading to browns are all used for side wall finishes, usually kalsomine on rough plaster. Many windows light the interior—a dark wall or closet is an unknown offense against good taste, and convenience in the bungalow builder's calendar. Upon the amount of light, and the exposure depends the colors used for any certain room in such a house. The dark room gets the yellow-toned finish, and the light, bright room the cool colors.

With such interiors—those in which the prevailing lines are straight and simple, and the prevailing colors plain—nothing but the simplest of hangings, and the plainest of furniture is in good taste. This does not mean that they must be cheap, or common. They may be as rarely fine quality as can be found but hangings must be plainly hung in straight lines, and furniture must not have the elaborate carving and ornate lines of the recent years.

I have seen bungalows in which the window draperies consisted of imported linens, in natural grays, combined with raw silks. Again, I have seen them hung throughout with cream colored domestic or unbleached muslin, stencilled in a conventional pattern in dull browns and greens. Either seemed equally suitable. With the imported linens and raw silks, went handsome Persian rugs and plain old mahogany furniture, which seemed in perfect accord with the craftsman's interior finish. With the unbleached stencilled hangings went willow and wicker furniture, a handwoven craftworker's rug, in strong, plain colors. None could say that the one was in better taste than the other. In each house was a living room table built by the same man who designed and built the house, finished to correspond to each interior. One seemed just as much at home in its surroundings as the other.

Other built-in features, which tend to make the Americanized bungalow a miracle of compactness and convenience are bookshelves, both open and enclosed; windowseats which serve as seats and couches, beneath which is built a box to hold things; ingle nook seats; buffets for the dining room; cupboards and closets for every purpose for which they may be needed in the kitchen; and the built-in bed which in many cases serves to turn a den into a guest bedchamber in time of need. This is the last and greatest triumph in the builder's catalog of conveniences.

Bungalow at Boulder, Colo.

Heating of the Modern Home

By CHARLES F. SMITH, Consulting Engineer.

HAVING decided that our modern home is to be heated by modern methods (it is immaterial just what method is to be employed), certain calculations must be made to ascertain the amount of heat in British thermal units required for each room; we may then determine how we will get that heat there.

Heat is transmitted to the outer air, or from a warm room to a colder one, at different rates through different forms of construction, and through different materials. The rate of transmission varies also with the temperature, that is to say, the greater the difference in temperature between the outer and inner air, the greater will be the rate of heat transmission, or heat loss.

It is the custom in this country to maintain a room temperature of 70 degrees, while in different localities the minimum outer temperature may be zero, 10 degrees above, or 10 or 20 degrees below zero; we must base our calculations on the lowest temperature to be expected in that particular locality.

Various formulas are in use for ascertaining the heat loss, but in all cases it is necessary to know the extent of exposed glass surface, the extent of net exposed wall surface, that is, the exposed wall surface minus the glass surface; the cubic contents and the exposure of the room. Unless additional ventilation is to be provided for, it is usual to allow for one air change per hour, in living rooms and bed-rooms, and three changes per hour in halls. In large living rooms, or parlors two air changes per hour must be provided for.

Our formula then, for determining the heat losses, or b.t.u. required becomes $W \times K + G \times L + C \times N \times T +$ a certain percentage for exposure in accordance with the following diagram.

In the formula W = net wall area, K = a constant, for different forms of wall construction in accordance with table No. 1; G = glass surface = full size of window openings, L = a constant in accordance with table No. 2; C = cubic contents of room, N = number of air changes per hour, and T, a constant in accordance with table No. 3.

If there is a cold space above, or below the room, the surface area of the ceiling, or floor, should be multiplied by the constant R or S, as the case may be, in table No. 4 and the quotient added to our previous total We now have the total b.t.u. required to maintain a certain definite temperature inside with the minimum outside temperature. If additional ventilation is to be provided for, it must be taken into account in considering the number of air changes per hour.

Even with the furnace; with indirect, or direct-indirect radiation, where fresh air is brought into the room, it is still highly desirable to install vent ducts to remove the vitiated air, while with direct radiation only, it is really imperative, if any degree of purity is to be maintained in the air of the room. The additional expense is slight, the benefits very great. Comparatively few people realize the importance of maintaining the highest degree of purity possible in the air in our homes. Second in importance only to the sanitary plumbing equipment, is the sanitary heating equipment of our modern home. Many close up the house at night, laboring under the fallacy that night air is injurious, forgetting that the air inside the house is heated, vitiated and loaded with poisonous gases. The purest air we breathe in the open country, is contaminated to a greater or less degree by carbonic acid gas (CO_2) usually 4 parts in 10,000 of fresh air. When this air is taken into the house it soon becomes still further contaminated by the respiration of the occupants, by burning of gas lights or oil lamps, and from other forms of combustion. Careful tests have demonstrated that the average amount of CO_2 given off by an adult is .6 cubic foot per hour, each cubic foot of gas burning .8 and an ordinary lamp 1.00 cubic foot per hour. The increase of CO_2 in parts per 10,000 of air should not exceed two or three, therefore we should not have the air in our home contaminated by more than 6 or 7 parts of CO_2 per 10,000 of fresh air, if we desire good health. Assume an unventilated room containing 1,800 cubic feet of air with 4 parts CO_2 per 10,000 or .0004 cubic foot per foot of air, lighted by three 4 ft. gas burners, with three occupants and heated by a steam radiator. Each individual gives off

.6 cubic feet CO_2 per hour, or a total of 1.8; the gas burners a total of 9.6 cubic feet per hour, a total addition of 11.4 cubic feet CO_2 each hour to the air in the room, or 11.4072

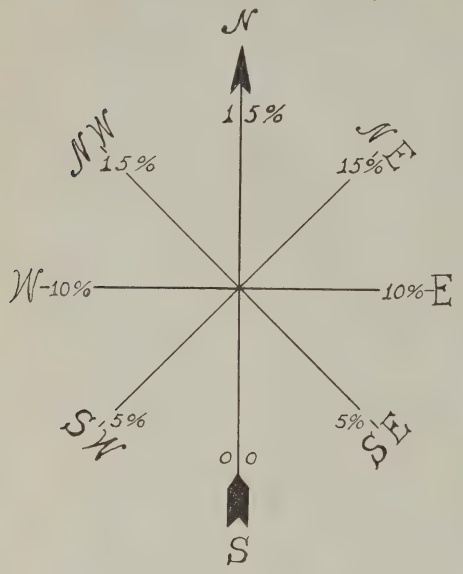


Diagram of Heat Units to be added for different exposures

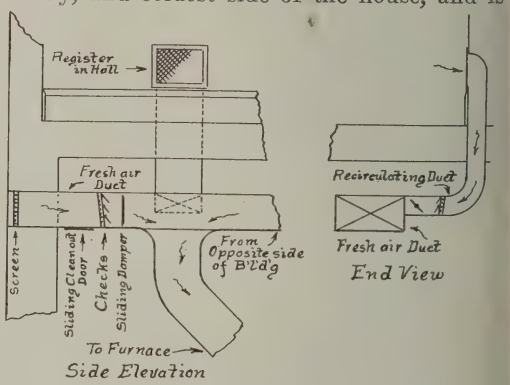
cubic feet at the end of the first hour, which equals 87 parts in 10,000, a proportion far beyond the danger point, particularly as in addition there are minute organisms, and other gases in the process of respiration, which are in fixed proportion to the amount of CO_2 in the vitiated atmosphere; yet this is not an imaginary case, but of altogether too frequent occurrence, and still people wonder why they are afflicted with severe headaches, loss of appetite and general debility. Pure air is absolutely essential to good health.

Having determined the amount of heat required for each room, and added it together for the total b.t.u.'s for the house, we must decide on the type and size of furnace to be used. There are two types of furnace in general use, the direct-draft and the indirect-draft. Either is more efficient in a brick setting than in sheet iron. The indirect is more efficient than the direct, but it must be thoroughly gas tight, and be provided with a direct cut-off damper, to be used when fresh coal is put on, or when it is desired to have the fire burn up more quickly. Every furnace must also be provided with a water pan of at least one square foot area, to add moisture to the heated air. An efficient furnace will utilize about 60 per cent of the heat units in the fuel, and as good coal has about 14,000 heat units per pound, and dry wood, net, about 5,800, there will be available for heating, with coal 8,400 b.t.u. and with wood 3,480 per pound. A good furnace with a good draft, on a cold day will consume five pounds of coal per square foot of grate surface per hour, which equals 42,000 heat units. We may then divide the total number of heat units required to heat the house in zero weather by 42,000, which gives us the square feet of grate surface necessary, and we must have a furnace with at least that area grate for coal.

The grate is an important part of the furnace, and the better one to have, is with triangular bars geared together, and operated by a detachable lever; this will break up a bed of clinkers and ashes without loss of good coal, and is easy to operate.

The furnace should be located as near the center of the cellar as possible, so that the hot-air pipes may be nearly the same length and they should incline upwards from the furnace a little. The pipes leading to the windy side of the house, and to the first floor should be the shorter and larger ones, as the heated air flows more readily toward the sheltered side, and to the upper floors.

The cold-air box should lead from the windy, and coldest side of the house, and is



Fresh-air Ducts for Furnace Heating

Figure 1

better made of galvanized sheet-iron, than of wood, as it is much tighter and cleaner, and only a little more expensive. It should be provided at the inlet with a galvanized iron wire screen of about No. 12 gauge, and about one-half inch mesh, and a sliding clean-out door in the bottom, just inside the screen and also a sliding cut-off damper. It is an excellent plan to provide a re-circulat-

ing duct connecting with the cold-air box for use in extreme cold weather, and at night when the fire is banked. This duct should be taken from the first floor, preferably from the hall, and in, or just above the base board. It should be from one-half to three-fourths the area of the cold-air box, depending upon the size of the house, and be provided with a register having adjustable louvres at the inlet, or an adjustable damper at its connection to the cold-air box. It should also be provided, between the register face and the connection to the cold-air box, with a galvanized-iron wire screen of No. 16 gauge and one-half inch mesh, inclined slightly from the vertical, fitted with gauze or light woolen flaps three or four inches wide extending the full width of the duct on light wire rods, as shown in Fig. 1, to prevent cold air returning through the register. Where it is possible to do so, it is well to extend the horizontal part of the cold-air box from one side, or end of the building to the other, providing each inlet with a wire screen, and six or eight inches further in, placing a check, or flap as above described, in order that a change in the direction of the wind will not affect the proper working of the system. The area of the cold-air box must not be less than three-fourths the total area of all the hot-air pipes, otherwise the pipes leading to the upper floors will get the most of the heated air, leaving the lower floor insufficiently supplied. Each hot-air pipe should be provided with an adjustable damper located near the furnace.

Round pipes are the most efficient, but it is rarely, if ever, that round vertical flues can be installed, owing to lack of room in the partitions; they are therefore made rectangular in shape, but should never be less than three and one-half inches deep, and deeper if possible, to avoid friction. While the temperature of the heated air in the vertical flues, under proper conditions will average 120 degrees F. it will be hotter than that when leaving the furnace, and it not infrequently happens that the furnace will be charged with fresh coal, the draft opened and then forgotten: in consequence the air becomes very much over-heated, and if proper precautions have not been taken in the installation, a fire will result. It is therefore essential that every possible precaution should be taken against fire in the installation of any kind of heating apparatus.

(To Be Continued.)

Table No 1. "K".

British thermal units lost through walls of Brick walls Lathed and Plastered inside	brick or frame with differences in temp^{s} external and internal air of- 40°	45	50	55	60	65	70	75	80
4" Thick	12.	13.	14.	16.	17.	18.	20.	21.	22.
8" "	10.	11.	12.	13.	14.	15.	16.	17.	18.
12" "	8.	9.	10.	11.	12.	13.	14.	15.	16.
16" "	7.2	8.1	9.	10.	11.	11.6	12.6	13.5	14.3
Clapb'ds or Shingles	18.	20.	22.	24.	26.	29.	31.	33.	35.
" with Paper	12.	14.	16.	17.	19.	20.	22.	23.	25.
" " Sheathing	11.	13.	14.	15.	17.	18.	20.	21.	22
" "Shthg & Paper	9.	10.	12.	13.	14.	15.	16.	17.	18.

All of above walls Lathed and Plastered inside.

Table No 2. "L".

British thermal units lost through windows and skylighlights with differences in temp^{s} external and internal air of-	40°	45	50	55	60	65	70	75	80
Single Glass	43.5	48	54.5	60	65.5	71	76	82.	87
Double "	24.7	27.8	31.	34.1	37.	40.2	43.4	46.5	49.6
Double Window	18.4	20.7	23.	25.3	27.6	29.9	32.2	34.5	36.8
Single Skylighlight	46.5	52	58.	64.	70.	75.	81.	87.	93.
Double " "	19.	22	24.	27	29	31.	34.	36.	39.

Table No 3. "T". Specific heat air .2375

British thermal units required to raise one cubic foot air from initial temp' Col' 1, to final of- Init^{l} Temp^{s}	Wgt of air lbs Cu ft	B.t.u. to raise 1 Cu ft 1°	60°	70	80	90	100	110	120	130	140	150
-20	.0903	.0214	1.716	1.931	2.145	2.36	2.575	2.789	3.004	3.218	3.432	3.647
-10	.0883	.0209	1.468	1.677	1.887	2.096	2.305	2.516	2.725	2.935	3.144	3.354
Zero	.0863	.0205	1.23	1.435	1.64	1.845	2.05	2.255	2.46	2.665	2.87	3.075
10	.0845	.0200	1.003	1.204	1.405	1.605	1.806	2.006	2.207	2.408	2.608	2.809
20	.0827	.0196	.786	.982	1.179	1.375	1.572	1.768	1.964	2.161	2.357	2.554
30	.0808	.0192	.576	.768	.960	1.152	1.344	1.536	1.727	1.919	2.111	2.302

Table No 4. "R" & "S".

British thermal units lost through Ceilings and Floors the space above considered as 40° and below as 35° with differences in temp^{s} of	15°	20	25	30	35	40
Ceilings.						
Lathed and Plastered	9.3	12.4	15.5	18.6	21.7	24.8
Lathed and Plast'd. Doublefloors	2.7	3.6	4.5	5.4	6.3	7.2
Lathed and Plast'd. Singlefloors	3.9	5.2	6.5	7.8	9.1	10.4
Floors.						
Single- Not Plastered	6.7	9.	11.3	13.5	15.7	18.
" Lathed and Plastered	3.9	5.2	6.5	7.8	9.1	10.4
Double- Not Plastered	4.7	6.2	7.8	9.3	10.9	12.4
Double- Lathed and Plastered	2.7	3.6	4.5	5.4	6.3	7.2

Table No 5. Actual velocity of air in flue in feet per minute by natural draft.

Height of Flue in feet	Temp' in flue above that of external air 5°	10	15	20	25	30	40	50	60	70	80	90	100	110	120	130	140	150
1	29	33	42	48	54	60	67	75	81	88	95	101	108	113	118	122	127	132
5	54	75	93	108	120	133	151	168	183	198	213	228	243	254	264	275	285	295
10	78	108	133	153	171	198	216	237	260	288	308	326	342	358	374	388	404	419
15	93	132	162	189	210	231	264	297	326	354	379	393	420	438	456	474	492	513
20	108	153	189	216	243	264	306	342	376	409	435	460	483	504	525	547	569	594
25	120	171	213	243	270	297	337	384	414	444	475	507	540	564	588	613	638	663
30	132	189	234	264	297	324	372	420	460	498	533	565	594	620	647	673	700	726
35	144	204	252	285	321	351	402	453	489	525	561	597	639	669	698	726	755	783
40	153	219	267	306	342	375	429	483	532	576	616	652	684	717	750	780	809	838
45	162	231	282	324	363	399	456	513	564	610	652	690	724	759	794	829	864	887
50	171	243	297	342	383	419	482	541	595	644	688	728	765	801	837	873	908	937
60	189	264	324	373	420	461	529	594	650	703	751	795	835	876	919	958	994	1028
70	204	285	351	408	456	495	569	637	698	756	815	856	900	936	972	1008	1044	1083
80	219	306	375	435	483	530	608	687	747	809	866	918	963	1012	1060	1108	1148	1185
90	231	324	399	459	516	564	645	729	794	859	919	973	1022	1071	1116	1155	1196	1248
100	243	342	420	486	530	594	680	768	842	910	972	1029	1080	1134	1188	1233	1276	1325

OUR READERS PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Ed.]

Answers

ARCHITECT'S COMMISSION.

From "Architectus," Buffalo, N. Y.

The best advice I can give to "Architectural Draftsman" is the following, which is taken from an authority on this subject:

"In the absence of any special agreement between the client and architect, the latter's commission is payable on the total contract amount as finally adjusted, and this would include any extras incurred in the progress of the work. The commission is payable to the architect on and at the same time as certificates issued to the builder are met by the client. The architect is in the position of an agent to the client, and as such has reasonable discretion in the matter of necessary variations and adjustments. If, however, the client is not satisfied with the way in which the work has been handled by the architect, he must still accept his certificates and accounts for charges, but has a remedy by counterclaiming for negligence or incompetence. Very good cause would have to be shown to substantiate such a claim and technical assistance would certainly be advisable."

You will stand no chance of winning a case against the owner, and you had better compromise. Get a licence before practising again and prevent trouble.

INLAYING.

(Tubal Cain, Chicago, Ill., will please look on another page for some remarks on the subject.)

BRICK, CONCRETE OR RUBBLE.

From "Bricklayer," Trenton, N. J.:

It may be that I am constituted on similar lines to the tanner, who when asked what would be—in his opinion—the best material to fortify the town with, which was threatened with bombardment, replied—"leather, sir, there is nothing like leather," and I may say right here, "there is nothing like bricks—good hard bricks—for the foundation walls of a moderate sized dwelling house. For very heavy buildings, stone, rubble or ashlar, is better perhaps, then comes concrete, which, when properly made, makes an excellent foundation; but there is "nothing like brick"—good hard brick—for a house foundation, if the ground is dry or well drained, and other things favorable. And the walls inside will be dry, smooth and clean. "There is nothing like brick."

VENTILATING SOIL PIPE.

From "Plumber, Newark, N. J.:

Replying to Amateur Plumber. His soil pipe should be ventilated by placing an open grating or a mica-flap valve (preferably the former) about two feet above the ground, at the lower end of the drain on the house side of the disconnecting trap. The soil pipe should be continued to about 3 feet above the roof of the building, leaving the end open. This will insure a continuous flow of air through the house drain and the soil pipe. There should be no other untrapped opening, and that referred to by the querist, near the foot of the soil pipe, should be removed.

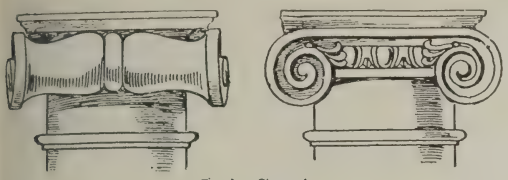
ORDERS OF ARCHITECTURE.

From "Old Workman," Cincinnati, Ohio:

I submit the following remarks for the benefit of a "Youthful Carpenter," and trust he may find them on the lines he inquires about. They are taken from an English work of instruction:

"The classical column used in woodwork and joinery is generally placed upon a square pedestal, which, like the different parts of the columns, should conform to certain defi-

nite proportions. The width of the pedestal itself is in all cases identical with that of the width of the base of the column. In our instructions for setting out the orders



Ionic Cap A

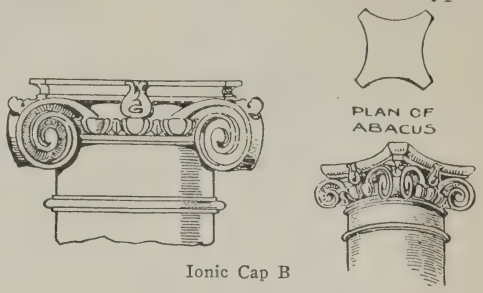
we have given the projection of the base as a quarter of the lower diameter; but if this errs at all the projection is rather too great than too little, and a fifth of the lower diameter may be taken if the designer so wishes. In this case, of course, the heights of the pedestals would remain about the same, but they would be contracted in width, making them appear rather taller and narrower.

The Doric pedestal is 2½ D. in height, and the width is equal to that of the base of column. Mark off 1½ D. from ground line on the center line, and, with that point as center, construct a circle as shown. The highest and lowest points of this circle will give the lower line of the capping mould and the top line of the plinth moulding respectively.

In the Ionic pedestal, as before, the width of the pedestal equals the width of base of column, and the total height is twice the base, as denoted by the two circles.

In the Corinthian the pedestal is 2½ D. in height. Measure ⅓ D. from the top to give the bottom line of the capping mould, and 1½ D. from this lower line will give the top line of the plinth moulding. It will be seen that the proportions are exceedingly simple, and that scarcely any explanation apart from the diagram is necessary.

The small sketches show the different types

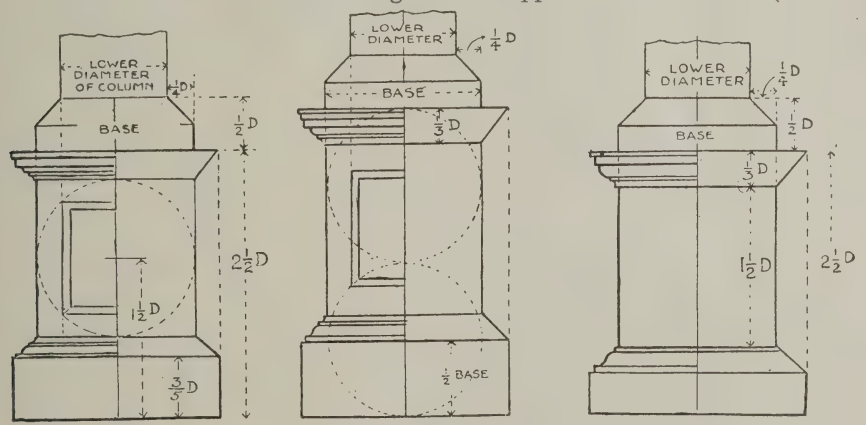


Ionic Cap B

of Ionic cap. In that which is shown in front and side elevation at A the abacus is square, and at B the plan of the abacus is curved, as in the Corinthian order, so that the capital presents the same appearance on all four sides.

If it is desirable to make the pedestals taller and narrower, make the projection of the base from the column 1/5 D. instead of ¼ D., as shown above."

Note: An article or two on this subject will appear in later issues. (Editor.)



DORIC IONIC CORINTHIAN

DEADENING.

From "Another Plasterer," Buffalo, N. Y.:

The question asked by "Plasterer" of Milwaukee, Wis., has been asked and answered so often that one would think every reader of this journal would know all there is to know about deadening. However, the best deadening for a wall is soft brick, the next, is mineral-wool, the next a poor mortar or plaster laid in the partitions. With the exception of mineral-wool, these are too heavy and are likely to pull both walls, ceiling

and floors, out of shape, but where a building is strong enough, or where the partitions run down to foundation walls, bricks or mortar may be used with profit. The three—brick, mortar or mineral-wool, answer as excellent fire protectors, and are vermin-proof. Nearly all other so-called "deadeners" are in a measure worthless, if not worse and should not be made use of when they can be avoided. Under the term "Mortar," must be included stuccos, and all preparations containing limes, cements or "Plaster of Paris."

Questions

STAIR-BUILDING.

From "C. B.," Medina, Ohio:

I am intending to make stair-building and hand-railing a specialty, and am desirous of getting all the information on the subject of stairs. I can and would like instructions as to the best course of training, and the best books to help me. I have had some experience in building straight flights of ordinary stairs, so know a little about them, but I wish to become an expert and know all I possibly can in this direction, and will be pleased to have the opinion of my fellow readers, and such suggestions as they may see fit to make, all of which will be appreciated greatly, by a regular reader.

HORSE OR ENGINE POWER.

From "Small Contractor," Manitowoc, Wis.:

The writer would like to know about the difference in the cost of using horse power or a donkey engine in hoisting bricks, mortar, and timber to the upper floors of a building during construction? I have always used a horse for the purpose, but am now thinking of buying a donkey engine of some kind. Perhaps some reader can give me a few pointers on the matter.

SEPTIC TANK SYSTEM.

Grom "Builder's Wife," Saskatoon, Northwest:

Is the septic tank system of sewerage disposal an efficient one for isolated buildings or farm houses? Please, some kindly disposed reader who has had experience with tanks of this kind, or anyone who knows, kindly give directions as to how to construct these tanks, choosing as an example one that has proved a success, and he, or they, may depend on my everlasting gratitude.

CUT NAILS VS. WIRE NAILS.

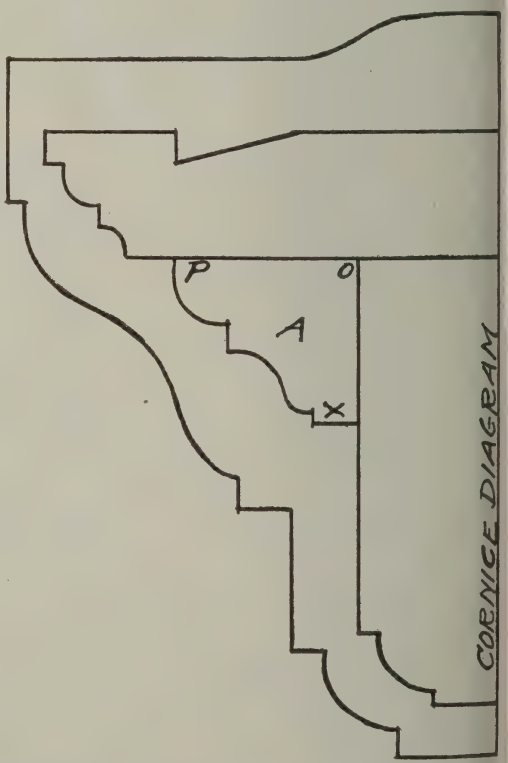
From "Jas. S. L.," Oswego, N. Y.:

Why is it that some carpenters prefer to use cut nails for shingling, while others, if they can possibly get wire nails for the purpose, will do so? I think myself that wire nails are cleaner, easier to handle, and have as great a holding power as the cut ail, and are about as cheap. Surely carpenters objecting to them must have some good reasons on which to base their objections.

CORNICE.

From "J. E. J.," Hartford, Conn.:

I send you a rough diagram of a cornice I am building, and would like very much to know which way the bed moulding A, should be put? It is to go in the angle O, and what



I wish to know is, should the point at P go up under the soffit or should it form the lower member at X? I have seen them used in both ways. Which is the right way? (See sketch).

THE DAY'S WORK.

Business men plan their day so every moment is engaged to the best advantage. Some can be seen only at certain hours, etc. They arrange their clerks and office force so some competent one is always in charge during lunch hour, and all vacations are figured in the same way.

Why do not all builders and contractors do the same with their days? Is their time any less important to them than the time of other business men who systematize the hours of work?

Unconsciously, we figure out each day just what we mean to accomplish. How many of us are able to always complete our schedule? How many "turn over the keys" on the appointed day?

The successful contractor is the one who can arrange his daily, weekly and even yearly schedules, and keep up to them. How does he do it?

The National Builder numbers among its subscribers many thousands of successful contractors. We want them to tell us how they plan their work—by days—by weeks—by jobs.

The writer of the best letter on the above subject will receive a $10.00 prize. The second best, $5.00, and each additional letter which we can use will be paid for at our usual rates.

All submitted articles must reach us by December 10th, and the names of the winners will be announced in our Christmas number.

The National Builder Literary Contest,
537 S. Dearborn St., Chicago.

Book Notices

Notice.—All books noticed in these columns may be obtained from this office at Publishers' prices. All postage or express prepaid. (Money and address must accompany all orders.)

MY TOWN OR COMMUNITY PATRIOTISM.—This is a live-wire little volume of about 140 pages, in which the ways to build up a town and keep it "humming," and in witty and trenchant phraseology, shows how citizens of many small towns commit municipal suicide by boosting up the big department stores of the cities, and leave the merchants of their own towns to wither and die, for the lack of the patronage that is gulped down by the departmental octopus. The author of this phillipic against the practice of ignoring your own merchants and favoring the worst enemies of your town, is George B. Irving of Chicago, who has evidently mastered the conditions surrounding this question of ignoring your own people. He gives sound advice on the subject, which, if followed, would inure much to the benefit and progress of the home town. The book is done up in paper cover, printed and published by George B. Irving, Rogerson Press, Chicago, Ill., and will be sent to any address, postpaid, on receipt of price.

There is need of just such a stirring book as this—or several of them—to put some sort of a "Westinghouse Brake" on the mail-order habit and departmental-store craze. It is a life and death struggle between the small towns, and their efforts to make good, because of the continuous drain of their life's blood by the big city shops. If the mayors of the various municipalities, that feel they are not progressing rapidly enough, because of this, or other defects, would see to it that a dozen or more copies were placed in the hands of as many of the prominent citizens, who would circulate their contents, we are sure there would soon be a change for the better felt in the community.

FIRE PREVENTION AND FIRE PROTECTION, AS APPLIED TO BUILDING CONSTRUCTION. Being a handbook of Theory and Practice, by Joseph K. Feitzag, B. S., C. E., author of Architectural Engineering, etc., etc., over 1,000 pages, 4¼x7¼ inches and about 400 illustrations and line diagrams. Printed on fine thin paper, in good readable type, well bound in morocco, published by John Wiley & Sons, Astor Place, New York. Price, $4.00.

This work is a useful and practical addition to fire protection literature, particularly so in the constructive side of the subject, as is offers many reliable suggestions for fire prevention during erection that will be found useful and efficient, if followed to a finish. Quoting from the preface by the author, he tells us that:

"In the past too much stress has been laid upon construction only, and fire-resistance has too often been confounded with non-combustibility. Fire-resistance worthy of the appellation must embrace, first, proper planning or design, which is the fire-protective feature of paramount importance in theaters, schools, etc.; second, construction; and last, but by no means least, auxiliary equipment to safeguard both the construction employed and the contents of the structure. Without any one of these essentials of fire protection, the fire-resisting qualities of a building are questionable, to say the least.

"The criticism may be made that greater stress should be laid upon a better average of building construction rather than upon high standards of detail in individual units. The distinction would be that a good average would tend to diminish conflagrations, but, unless special attention be paid to the details which often constitute the crucial weaknesses in case of fire, separate buildings would still be subject to great damage and loss of life."

Many of the illustrations and diagrams are new, and extremely valuable, because of their being easily applied to cases in hand, in which the designer can manifest his appreciation of the methods of construction described and explained in the text. Slow-burning materials employed in building are dealt with at length and the results of a number of severe tests are given, and explained, and many hints in fire-resisting construction are profusely scattered throughout the whole work. The book will prove a great help to architects, civil engineers, underwriters, builders and insurance men generally. The whole subject is divided into six main divisions, which are again divided into chapters bearing on the various phases of the contents, and the whole is indexed alphabetically, and arranged so that references may be easily made.

ELEVATOR SHAFT CONSTRUCTION, OR PRACTICAL SUGGESTIONS FOR THE INSTALLATION OF ELECTRIC ELEVATORS IN BUILDINGS. By H. Robert Cullmer, assisted by Albert Bauer, with introductory note by R. Pelham Bolton. A treatise for the architect and builder, covering the surveying and preparing of detail drawings for elevator shafts, machine rooms, elevator bulkheads; tables and formulae for calculating the size and capacity of elevators, sidewalk elevators, dumb-waiters; specification writing for elevator installation, elevator shaft doors and appliances, building regulations, covering elevator installation. 170 pages, 7x9 in., including over fifty well-executed engravings, and is strongly bound in maroon cloth. Published by The Wm. Comstock Co., New York. Postpaid, price, $3.00.

This is an excellent book, and is the first that has been prepared exclusively on this subject from a technical point of view, and much credit is due to the authors for the thorough manner in which they have dealt with a subject so little known, or understood, as that under notice; and no useful and reliable data, suited to the requirements of the architect or builder, planning or placing an elevator equipment in any building, has ever before been placed in reach of the public. New York practice is followed and the building department laws and regulations of that city are made the standard. The authors have also made a careful study of the regulations in use else-

where, giving the deviations from New York requirements. Specification writing for elevator equipment has been covered by two forms; one a simple specification for a single elevator, the other a more elaborate equipment embracing several styles of cars suitable for an office building.

The book contains much practical information, and it is the hope of the authors that they have omitted no important point. Every phase of the shaft problem in building construction has been covered, and the method of presentation is such that ready reference is possible to any detail of the subject. In large towns and cities where elevators are largely used, this book should be found on the desk of every architect or builder.

ARTISTIC BRIDGE DESIGN. Being a systematic treatise on the design of modern bridges according to æsthetic principles. By Henry Grattan Tyrrell, C. E., (Toronto University). Bridge and Structural Engineer, and author of a number of popular works on mill building construction, concrete bridges and other works on building construction. The work covers some 294 pages, 6x9 inches, 242 fine photo engravings and other illustrations. Printed in large sized type on fine overlaid paper, and bound in strong cloth. Published by Myron C. Clark Publishing Co., Chicago. Price, prepaid, $3.00.

A book on the artistic treatment of structural bridges is something out of the usual, and we are persuaded the departure is a good, and certainly a wise one, for, of all the structures designed and erected by American architects and structural engineers, the many great and otherwise grand bridges, of which we have so many, scattered about the country, they are, from an æsthetic point of view, the least entitled to credit, and it is really to be regretted that so many noble examples of engineering skill should be clothed in such commonplace—and in many instances—positively ugly mantles, some of them are obliged to suffer under. This book is intended to a great extent to combat the idea that "any old thing" of a design is good enough for a bridge, and to show that the impression, which now prevails, that bridge building consists only in the development of formulæ, the solution of problems in graphic statics and the computation of stresses in truss frames: whereas, this is not design at all, but merely a process in producing a design. Almost no attention has been given by engineers in America to the artistic character of bridges, and but little to their proper proportions, or to the selection of economic types. The engineers and mathematicians of the last fifty years have been so busy wrestling with abstruse constructive problems, evolving formulæ and establishing their conclusions, which in this direction have left little to be desired, and their time and efforts have been so taken up, that none were left to devote to beautifying their creations. William Tyrrell, however, has made a break in the interests of better taste being employed in bridge construction, and we think that out of his efforts, we may safely look forward for a greater display of artistic merit visible in all our coming bridges.

The book is well illustrated by many designs and drawings, of some of the most beautiful bridges in existence—ancient and modern—and will doubtless prove of great help to designers, builders and proprietors.

Patents

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

1,034,395. Sliding door fastener. D. E. Hrauger, Atlantic, Iowa.

1,034,328. Fireproof door. Jas. A. Wheeler, Somerset Co., N. J.

1,034,770. Wall. F. M. Emerson, assor. Emerson & Norris Company, Boston, Mass.

1,034,608. Track for door hangers. P. Frantz, assor. Frantz Manufacturing Company, Sterling, Ill.

1,034,789. Flushing device for water closets. P. Haas, Dayton, Ohio.

1,034,913. Concrete floor decking. R. B. Higgins and H. Albers, assors. Higgins-Albers Concrete Form Company, St. Louis, Mo.

1,035,010. Suspending device for storm windows and like structures. Jno. M. Hjermstad, Red Wing, Minn.

1,034,478. Fireproof door or shutter. Ed. H. McCloud, Columbus, Ohio.

1,035,033. Flooring square. M. Nelson, New York City.

1,034,746. Plaster board. C. W. Utzman, assor. The United States Gypsum Company, Chicago, Ill.

1,035,064. Door hanger. C. T. Westlin and G. S. Ellithorpe, Maplewood, N. J.

1,034,854. Concrete block machine. M. Wohl, Jamaica, N. Y.

1,035,298. Door check. Wm. H. Aspegren, Quincy, Mass.

1,035,766. Method and apparatus for constructing concrete buildings. A. R. Baltzer, assor. two-thirds to C. H. Crawford, Chicago, Ill.

1,035,826. Constructing concrete buildings. A. R. Baltzer, assor. one-half to C. H. Crawford, Chicago, Ill.

1,035,314. Automatic fire door closer. Jas. A. Bunce, Seattle, Wash.

1,035,709. Foundation fastener. D. S. Jenkins, Las Animas, Colo.

1,035,206. Fireproof building construction. H. L. Lewen, assor. International Corporation of Modern Improvements, New York City.

1,035,235. Corner bead for building construction. J. H. von Rehder, Winfield, New York.

1,035,235. Door check and holder. A. Rispel, Chicago, Ill.

1,035,470. Window fastener. Chas. W. Roberts, Los Angeles, Cal.

1,035,392. Window ventilator. Jno. F. G. Smith, Washington, D. C.

1,036,427. Building material. Chas. S. Bird, Walpole, Mass.

1,036,068. Device for placing concrete in forms. L. C. Brink, Elmsford, N. Y.

1,036,090. Sectional molded wood. H. E. Gallagher, Portland, Ore.

1,036,583. Sash lock. Wm. J. Diedrich, Waukesha, Wis.

1,036,987. Fire escape. M. B. Felnen, Jersey City, N. J.

1,036,832. Sheet metal door construction. Ed. Gustafson, assor. ½ L. Olson, Jamestown, N. Y.

1,037,142. Anchor or bolt insert for concrete structures. L. P. Hazen, Cincinnati, O.

1,036,646. Door attachment. O. Klonower, Philadelphia, Pa.

1,037,026. Fire escape. Robt. Lang and W. E. James, St. Louis, Mo.

1,037,034. Closet flush. H. W. Merkel, Cincinnati, O.

1,036,898. Rendering cement, etc., waterproof. R. A. Plumb, assor. Trussed Concrete Steel Co., Detroit, Mich.

1,036,721. Door and window closure. B. C. Rockwell, Malvern, Ark.

1,037,062. Sanitary water closet. Jos. C. Seyl, Chicago, Ill.

1,037,720. Weather strip. Jos. Baumruk, Chicago, Ill.

1,037,416. Concrete construction. Chas. W. Beverstock, Los Angeles, Cal.

1,037,439. Door stop. A. A. Coffin, Cleveland, O.

1,037,457. Door securing device. E. G. Dodge, San Francisco, Cal.

1,037,738. Fastening device for doors, covers, etc. Wm. S. Elliott, Pittsburgh, Pa.

1,037,267. Door opening and closing mechanism. F. Knight, New Haven, Conn.

1,037,641. Door check. Jno. Koch, Jr., Brookline, Mass.

1,037,302. Sash fastener. J. F. Parent, Plainfield, N. J.

1,037,523. Concrete reinforcement. E. D. Pitt, Niagara Falls, Ontario, Can.

1,037,321. Building construction. Jas. D. Rives, assor. ¼ J. W. Blosser, Atlanta, Ga.

1,037,662. Window lock. Geo. D. Roberts and M. T. Flanagan, New York City.

1,037,333. Fire escape apparatus. Jos. T. Scheuer, Two Creeks, Wis.

1,037,668. Building light and ventilator. Philip Schwickart, New York, N. Y.

1,037,674. Door lock and signal. N. Silverson, New York City.

1,038,125. Producing concrete. H. J. Harms and G. E. Small, assors. Monogram Construction Co., Orange, N. J.

1,038,160. Metal window frame. E. R. Leonard, Woodcliff, N. J.

1,037,938. Folding blind. Jno. F. Lessing, St. Joseph, Mich.

1,038,502. Door hanger. Jas. T. McCabe, New York, N. Y.

1,038,199. Combined cash fastener and anti-rattling device. M. J. D. Rast, St. Louis, Mo.

1,038,440. Composite building frame structure. R. H. Robinson, Chicago, Ill.

1,038,224. Window. A. C. Soule, assor. Soule Reversible Window Co., San Francisco, Cal.

1,038,026. Fire extinguisher. J. B. Thomas, Boston, Mass.

1,038,461. Ventilating window lock. L. H. Thomas, Bloomington, Ill.

1,038,467. Building construction. A. Westendorf, Buffalo, Iowa.

1,038,257. Ferroconcrete construction of buildings. Thos. I. Yourelle and J. Bellingham, Wellington, New Zealand.

1,038,837. Combined door operating and locking device. F. M. Brinckerhoff, assor. National Pneumatic Co., Chicago, Ill.

1,038,859. Fire extinguishing apparatus. Wm. L. Deming, assor. the Deming Company, Salem, O.

1,038,551. Fireproof floor system. Wm. D. Forsyth, Youngstown, O.

1,038,590. Door. Wm. R. Jeavons, Cleveland, O.

1,038,635. Constructing foundations. Jno. F. O'Rourke, New York, N. Y.

1,038,986. Mold for concrete buildings. Jos. Stretch, assor. F. D. Lambie, Montclair, N. J.

1,038,994. Door frame. Chas. P. Vernier, Cedar Rapids, Iowa.

1,038,807. Floor scraper. Jno. Wetsue, Seattle, Wash.

1,039,246. Door hanger. L. A. Bittorf, assor. National Mfg. Co., Sterling, Ill.

1,039,089. Silo. Jno. Borrusch, Maryville, Mo.

1,039,664. Heating and ventilating apparatus. C. W. Edgar, Los Angeles, Cal.

1,039,371. Hollow metal door and the like. A. J. Ellis, assor. A. J. Ellis, Inc., Woodcliff-on-Hudson, N. J.

1,039,370. Hollow metal door. A. J. Ellis and C. E. Nellis, assors. A. J. Ellis, Inc., Woodcliff-on-Hudson, N. J.

1,039,393. Door operating mechanism. Thos. J. Heron, Pittsburgh, Pa.

1,039,291. Fastener for blind slats. B. Jackle, Locherhof, Germany.

1,039,136. Securing clip for wall structures. A. L. Johnson, Hamburg, N. Y., assor. Corrugated Bar Co., St. Louis, Mo.

1,039,313. Construction of building walls. Jno. Mitchell, Ponsonby, New Zealand.

1,039,213. Concrete pouring system. R. F. Taylor, Los Angeles, Cal.

Trademarks.

87,907. Window sash chains. Thos. Morton, New York City.

88,298. Building, sheathing, roofing, etc., papers. Hydrex Felt & Engineering Co., Portland, Me.

LEGAL DECISIONS

OF INTEREST TO BUILDERS

Prepared for the
NATIONAL BUILDER
by George H. Murdock

The mechanics' lien statute should be liberally construed in favor of laborers and materialmen to protect them.—Sarshet v. Legg, 118 P. (Ore.) 203.

Refusal by the architect to approve the contractor's work is immaterial, in determining the time of the completion of the work, within L. O. L., Section 7420, when the owner accepted the building.—Sarchet v. Legg, 118 P. (Ore.) 203.

Plans and specifications drawn by an architect for the erection of a building are not "materials," within the purview of Revisal 1905, Section 2016, giving a mechanic's lien upon buildings for materials furnished.—Stephens v. Hicks, 72 S. E. (N. C.) 313.

A materialman's lien is created by law when the labor and materials are furnished; claimant being required, to perfect his lien for enforcement by bill in equity, only to record his statement of lien in the town clerk's office, as required by statute.—Witham v. Wing, 81 A. (Me.) 100.

A lien is not allowed for the construction of a sidewalk called for in a building contract, and the completion of the building, within L. O. L., Section 7420, fixing the time for filing lien notices after the completion of the work does not depend on finishing the sidewalk.—Sarchet v. Legg, 118 P. (Ore.) 203.

Plaintiff orally agreed to construct a building for defendant according to certain plans for $33,000. The written contract, when presented to defendant for execution, called for $35,000, and when defendant objected plaintiff stated that he put in $35,000 because the agreed price would look too cheap, and that he would give defendant a private contract. The contract was thereupon signed as prepared, and filed for record. Immediately after its execution, plaintiff wrote and delivered to defendant a private memorandum, by which he agreed to complete the building for $33,000. Held, that such memorandum was a part of the contract between the parties, and, never having been filed, the whole contract was unenforceable under Code Civ. Proc., Section 1183, requiring building contracts to be in writing when the amount exceeds $1,000, and the memorandum filed in the office of the county recorder; otherwise "they shall be wholly void, and no recovery shall be had thereon by either party."—California Portland Cement Co. v. Wentworth Hotel Co., 113 P. (Cal.) 113.

Under L. O. L., Secs. 7416, 7420, 7425, requiring the material man to file within thirty days after the completion of the work or after he has ceased to furnish materials, a claim for lien, and providing that no payment by the owner to any contractor before thirty days from the completion of the building shall defeat any lien for materials, a lien may be filed at any time after furnishing the last materials and before thirty days from the completion of the building, and a claim of lien filed after the furnishing of the materials and before the completion of the building is not filed prematurely.—Wills v. Zanello et al., 117 P. (Ore.) 291.

Where a builder, in response to the owner's request, and after the owner's statement that the projected improvement could not be made, if it was to cost in excess of a specified amount, which was the extent of the owner's resources, informed the owner that it could be done for that amount, and the owner relied on such information and made a contract with the builder for the improvement on the basis of cost of labor and materials, plus the builder's compensation, whether the builder was under any duty to give the information was immaterial on the issue of the estoppel against him to charge a greatly increased amount for cost of labor and materials.—John V. Schaefer, Jr., & Co. v. Ely et al., 80 A. (Conn.) 775.

Where a contract to erect a power and heating plant according to specifications called for "sectional covering * * * air cells, class A," and the contractor furnished covering known to the trade as "air cells, sectional covering, class A," but the architect, supposing that the only kind of covering that would conform to the specifications was that manufactured by a particular manufacturer, rejected the work, the mere fact that the covering furnished was not inferior, in quality or otherwise, to that of the particular manufacturer, did not prevent the decision of the architect from being conclusive, he acting in good faith and not whimsically, though somewhat ignorantly or mistakenly.—Evans et al. v. Middlesex County, 95 N. E. (Mass.) 897.

Building Material Price List

Revised to Date.

*Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red Cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

Dimensions,	Seattle, Wash., Corrected by F. T. Bradley. M ft. BM	Chicago, Corrected by J.H. Touchstone. M ft. BM S 2 S	Omaha, Neb., Corrected by I. P. Hicks. M ft. BM S 2 S	Southern Ontario, Corrected by F. O. Frantz. M ft. BM S 2 S
2"x4" to 8" up to 16', No. 1	$11.00	$20.00	yp $26.00	h $24.00
2"x4" to 8" up to 16', No. 2		18.00	24.00	22.00
2"x4" 18 and 20', No. 1		21.05	27.00	26.00
2"x10" up to 16', No. 1	12.00	20.50	28.00	24.00
2"x12" up to 16', No. 1		21.50	30.00	25.00
2"x14" up to 16', No. 1	12.50	*	*	26.00
Each 2 ft. over 20 ft., add per M		1.00	1.00	2.00
Select stock as above, add per M	6.00	5.00	*	*
Exterior Finish, Etc.—		**M ft. BM D 4 S**	**M ft. BM D 4 S**	**M ft. BM D 4 S**
1"x3" to 1"x8", No. 1	30.00	yp $32.00	yp $45.00	wp $35.00
1"x16", No. 1	39.00	32.00	43.00	40.00
1"x12", No. 1	35.00	37.00	46.00	42.00
1¼"x3" to 1¼"x12", No. 1		45.00	48.00	45.00
1½" and 2" same as above		42.00	48.00	42.00
1" drop siding, No. 1	25.00	24.00	30.00	30.00
½" lap siding, No. 1 cedar	25.00	*	rdw 30.00	30.00
Enclosing and Fence Boards—		**M ft. BM S 1 S**	**M ft. BM S 1 S**	**M ft. BM S 1 S**
1"x4" to 1"x8", No. 1		yp $23.00	yp $25.00	wp $30.00
1"x8" to 1"x12", No. 1	11.00	23.00	24.00	h 24.00
1"x16", No. 1		*	24.00	24.00
1"x16", No. 2	15.00	*	22.00	22.00
Interior Finish, Flooring, Ceiling, Etc.—		**M ft. BM D S**	**M ft. BM D 4 S**	**M ft. BM D 4 S**
½"x7/8", T. & G. Flooring, No. 1	30.00	yp $26.50	yp $38.00	wp $40.00
½", T. & G. Flooring, No. 2	27.00	*	34.00	wp 30.00
Ceiling per M	25.00	1.00	2.00	1.00
Partition per M	30.00	2.00	2.00	2.00
5/8"x4" Ceiling No 1	17.00	22.00	30.00	np 30.00
		100 ft. run	**100 ft. run**	**100 ft. run**
4¼" Moulded Casing	.02	yp $1.52	yp $2.00	wp $2.00
4¾" Moulded Casing	.02½	1.68	2.50	2.50
7¼" Moulded Base	.08	2.53	3.50	4.50
½"x9¼" Moulded Base		3.75	4.00	6.00
1½"x4½" Moulded Window Stool	.02½	2.12	3.00	4.00
Miscellaneous List—		**Per M**	**Per M**	**Per M**
Shingles, No. 1		rc $3.30	$4.00	bc rc $3.75
Shingles, No. 2		3.35	3.75	*
Shingles, fancy		W. C.	4.50	6.00
Lath, 4 ft., No. 1		yp 3.60	y 5.50	wp 5.00
Lath, 4 ft., No. 2		2.75	5.00	s 3.75
Pickets, 1"x3"x4' 6", dressed		35.00	30.00	*
Pickets, 1"x3"x4' 6", rough		*	*	*
		Piece	**Piece**	**Piece**
6"x8' Post split		Cdr $0.13	Cdr $0.25	*
8"x8' Post split		.17	.30	*
8"x8' Post whole		.66	.40	Cdr $0.30
6"x8' Post whole		.25	.35	.25
Hardware List—		**Cw.**	**Cwt.**	**Cwt.**
Nails, wire, common		$2.25	$3.00	$2.85
Nails, cut, common		2.10	*	3.00
Nails, wire, fine finishing		2.65	3.50	4.00
Sash Weights, cast iron		1.60	1.50	2.25
Tarred Felt Paper, best 2-ply		Roll $1.00	Roll $1.00	Roll *
Tarred Felt Paper, 3-ply			1.25	*
Red Rosin, Atlas brand			.90	$0.50
Red Rosin, durable brand			.75	.60
Black Neponset			*	2.50
Masons' Supplies—		**Per M**	**Per M**	**Per M**
Brick, blue, at kilns		*	*	*
Brick, blue, at kilns, No.		*	*	*
Brick, blue, at kilns, No. 2		$7.50	*	
Brick, white, delivered, face		7.00	*	*
Brick, red, delivered, backing		7.00	7.50	*
Brick, delivered, dry pressed		18.00	18.00	$17.00
Brick, vitrified, dry pressed		*	24.00	*
Lime, best gray		bbl. $1.30	bbl. $1.25	bbl. *
Lime, best white		1.40	1.25	1.80
Cement, Portland		.95	1.85	*
Plaster, calcined		2.40	1.80	bbl. $2.50
Hair, 8 lb. per bush		.25	.25	*

NOTE—While these figures are approximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

New York Prices for Lumber

	SPRUCE	L. L. Y. P.	S. L. Y. P.
2x2—2 x2½—2x3 2x4—2½x4 —3x4	Average price.....$29.00	.....$32.00	.....$26.00
2x6—2x7—2x8 3x6—3x7—3x8 4x6—4x8	19 feet and under.. 32.00 Over 19 feet..... 34.00	Up to 28 feet.. 30.00	Up to 28 feet.. 28.00
2x9—2x10—2x12 3x9—3x10—3x12	19 feet and over.. 34.00 Over 19 feet..... 37.00		
2x9—2x10 3x9—3x10 4x9—4x10		Up to 28 feet.. 33.00	Up to 28 feet.. 29.00
2x12— 4x12 3x12— 6x12 8x12—10x12—12x12		Up to 28 feet.. 38.00	Up to 28 feet.. 32.00
14-inch		Up to 28 feet.. 42.00	Up to 28 feet.. 36.00
16-inch		Up to 28 feet.. 48.00	
"Squares" (6x6—6x8—8x8—8x10—10x10)		Up to 28 feet.. 33.00	Up to 28 feet.. 30.00

⅞-in. and 1⅛-in. white pine cornice, sound knotted..... 55.00
⅞-in. and 1⅛-in. cypress cornice, clear..... 60.00
⅞-in. and 1⅛-in. cypress cornice, select..... 50.00
6-in. red cedar or redwood bevel siding, clear, 8 to 16 feet..... 30.00
6-in. white pine, clear, 12 to 16 feet..... 45.00
6-in. white pine, No. 2, 12 to 16 feet..... 40.00

ROOFING, T. & G., SHIP-LAP OR SQUARE EDGE.

⅞x5½-in. face, N. C. pine, 10 to 16 feet 25.00
⅞x7½-in. face, N. C. pine, 10 to 16 feet 26.00
⅞x9½-in. face, N. C. pine, 10 to 16 feet 26.00
1⅛x5½-in. face, N. C. pine, 10 to 16 feet 26.00
⅞x5½ to 7½-in. spruce 28.00
⅞x5½ to 7½-in. Hemlock 27.00

FLOORING.

⅞x2½ to 4½-in. N. C. pine, or yellow pine, flat grain, No. 1, 10 to 16 feet..... 33.00
⅞x2½ to 4½-in. N. C. pine, or yellor pine, flat grain, No. 2, 10 to 16 feet..... 28.00
⅞x2½ to 4½-in. N. C. pine, or yellow pine, flat grain, No. 3, 10 to 16 feet..... 22.00
⅞x2½-in. N. C. pine, comb grain, No. 1, 10 to 16 feet 47.00
⅞x2½-in. N. C. pine, comb grain, No. 2, 10 to 16 ft. 40.00
⅞x2½-in. yellow pine, comb grain, "A Heart," 10 to 16 feet..... 65.00
⅞x2½-in. yellow pine, comb grain, "A Sap," 10 to 16 feet 48.00
⅞-in. maple flooring, 2 feet and up, clear 48.00
⅞-in. maple flooring, 2 feet and up, No. 1 ..... 43.00
⅞-in. plain oak flooring, 2 feet and up, clear 65.00
⅞-in. plain oak flooring, 2 feet and up, selects 56.00
⅞-in. quartered oak flooring, 2 feet and up, clear.....105.00

SHINGLES.

18-in. red cedar, "Eureka" 6.25
18-in. red cedar, "Perfection" 5.75
18-in. white cedar, XXXX 6.50
18-in. white cedar, clear butt 5.50
16-in. white cedar, extra 5.00
16-in. white cedar, clear butt 4.50
6x18-in. cypress, No. 1, Heart (on 6-in. basis)..... 11.00
6x18-in. cypress, No. 1, Sap or "A" (on 6-in. basis)..... 9.00
6x20-in. cypress, No. 1, Heart (on 6-in. basis)..... 14.00
6x20-in. silver gray cedar, No. 1 (on 6-in. basis)..... 18.00
6x20-in. silver gray cedar, "A" (on 6-in. basis)..... 15.00
6x20-in. silver gray cedar, Star (on 6-in. basis)..... 12.00

CEILING.

¼-in. N. C. pine ceiling, clear, one side, 10 to 16 feet..... 27.00
¼-in. N. C. pine ceiling, No. 2, one side, 10 to 16 feet..... 24.00
¼-in. N. C. pine ceiling, clear, one side, 10 to 16 feet..... 24.00
⅛-in. N. C. pine ceiling, clear, one side, 10 to 16 feet..... 35.00
⅛-in. N. C. pine ceiling, clear, two sides, 10 to 16 feet..... 37.50
1¼-in. N. C. pine ceiling, clear, one side, 10 to 16 feet..... 37.50
1⅛-in. N. C. pine ceiling, clear, two sides, 10 to 16 feet..... 40.00

	CYP.	Y. P.	W. P.
4¼-in. moulded casing	$2.75	$2.25	$3.30
4¼-in. moulded base	3.00	2.50	3.75

NOTE.—These prices are for less than car lots delivered on the job, within reasonable limits in New York, Brooklyn and the adjoining districts.

Trade Review

The various trade mentions which have appeared from time to time in these columns have been written by the editorial staff of the National Builder for the benefit of our subscribers. We have found that our readers are interested in the descriptions of new materials, machinery, tools and other apparatus used in building construction.

The changes taking place from time to time in the building field should be brought to the attention of our readers, to keep them posted on the general business advance, that they may take advantage of the thought and effort which others have brought into their work.

To do this to the best advantage it has frequently been found advisable to mention the products of various manufacturers, many of whom are advertisers in the National Builder. This does not mean, however, that these articles are paid for in any way, for they are not. In fact, no advertiser or other concern of any character could buy space in these columns at any price.

Under the new postal law, passed August 24th, 1912, any reference to an advertiser or firm or to any particular material which could be interpreted as a paid advertisement might be interpreted as advertising matter and as such must be clearly designated.

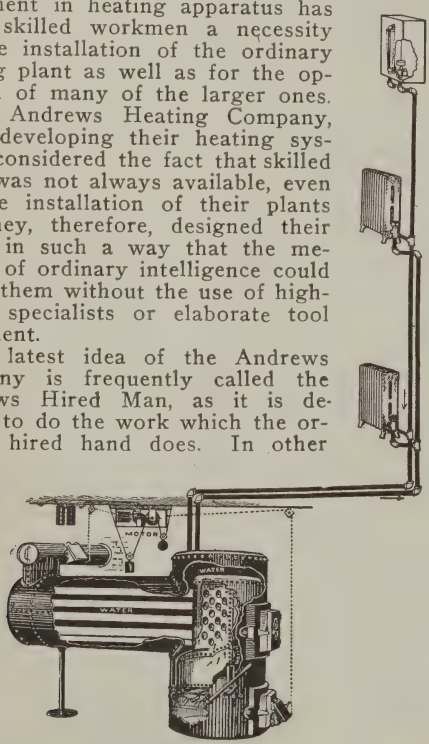
In order, therefore, to conform with the letter of the law, this section is designated "Advertisers' Section," and each page is so marked.

THE ANDREWS HIRED MAN.

Employes are a necessary part of every large household and in many of them their use is absolutely necessary. The recent development in heating apparatus has made skilled workmen a necessity for the installation of the ordinary heating plant as well as for the operation of many of the larger ones.

The Andrews Heating Company, while developing their heating systems, considered the fact that skilled labor was not always available, even for the installation of their plants and they, therefore, designed their plants in such a way that the mechanic of ordinary intelligence could install them without the use of high-priced specialists or elaborate tool equipment.

The latest idea of the Andrews Company is frequently called the Andrews Hired Man, as it is designed to do the work which the ordinary hired hand does. In other words, the Andrews Hired Man is a thermostatic regulator which regulates the heating equipment so as to provide a uniform temperature for the interior, regardless of the outside weather conditions. This regulator is designed to be placed in one of the various rooms to be heated and regulates the furnace as the temperature in that room changes. A simple device permits a wide variation of temperature. That is, the thermostat can be adjusted instantly to provide any desired temperature. A saving is thus effected by reducing the temperature at night.



A clock attachment permits the heat being turned on at any desired moment and all this is done without any attention whatever.

The Andrews Heating Company would be glad to send a more complete description of this useful apparatus to such of our readers as are interested in the heating subject.

THE ECONOMY WAY.

The back-to-the-farm movement has called the attention of thinking people to the reason why the farm has not been as popular as the city. Those who have lived in the city have become accustomed to many of the conveniences, such as gas, water, etc., and when these people go back to the farm, they immediately miss them.

As few of the commercial gas companies extend their lines into the farming districts, it is necessary to have a local system. The Economy Gas Machine Company, 504 Cox building, Rochester, N. Y., have made a long study of the subject of lighting and cooking by gas and have constructed a machine which has proven extremely satisfactory for isolated plants. This machine occupies about the space of two or three barrels and is absolutely safe, as none of the gas or gas material is stored in the house, so there is no more risk of fire or explosion than in the city apartment.

Contractors who contemplate the erection of homes in the country where modern conveniences are desired, should investigate the Economy Way and learn how these machines can be installed with perfect satisfaction.

WAITING FOR A SIMONDS SAW

MADE OF SIMONDS STEEL

Simonds Steel is made in a Simonds Steel mill by an exclusive Simonds process for Simonds Saws.

This patented process gives Simonds Steel an unequalled uniformity of temper and cutting power—that is why

Simonds Saws Are the Best —and They ARE the Best

That is why we guarantee every Simonds Saw to meet any fair trial—money back whenever it fails to do all that a good saw should.

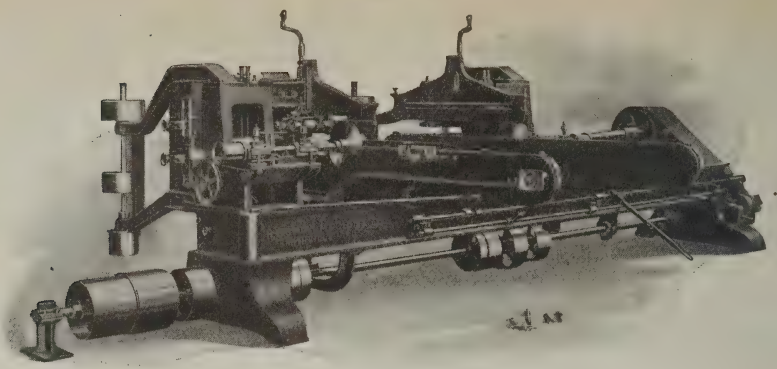
Whether you are a carpenter and *must* have the best, or an amateur craftsman who will enjoy the best, buy a Simonds Hand Saw. In mills, factories and lumber camps, Simonds Circular, Band, Cross-cut and other saws for trade use command the highest price and are conceded the standard by which competition is measured.

This trade mark is etched on every saw—see that it appears or refuse to purchase. If you can't get a Simonds Saw from your dealer, send us his name and write us direct—we will see that you are promptly supplied.

Our book, "Simonds Guide for Carpenters" mailed free on request.

SIMONDS MANUFACTURING CO.
Fitchburg, Mass.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Front-end Perspective of No. 200-Be Heavy Double-end Tenoner.

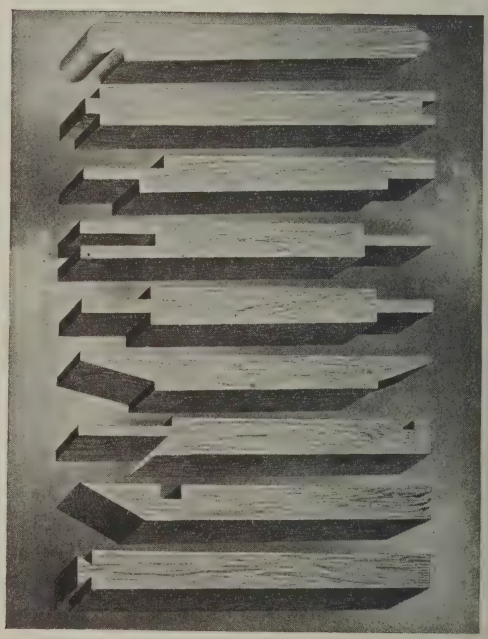
SMITH'S DOUBLE END TENONER.

While the double end tenoning machine has been made for thirty-five to forty years, it is only in recent years that there has been a demand for complete machines of this character. We show on this page one form of this machine as made by the H. B. Smith Machine Company, Smithville, N. J., as well as a panel showing some of the many cuts possible with it. This style is one of several made by the Smith company and it is meeting with complete satisfaction in all places where it has been used.

The introduction of veneer stock and panels has led to the development of a special device by which the thin veneer is scored or cut before the knives reach them, thus permitting the machine to cut tenons without lifting up or marring the shoulders. This device consists of fine saws set both above and below the work and just preceding the tenon heads. These saws are adjustable for all dimensions of material and have proven entirely satisfactory in this class of work.

The various working parts of the machine are adjustable for different classes of work and for materials. The machine is automatic for all the work for which it is designed, thus permitting the foreman to set the machine so that the cheaper workmen can operate it and obtain perfect results.

The complete description of this machine showing various views and describing in great detail its construction and operation will be sent upon request to the H. B. Smith Machine Company.



METAL CEILINGS.

The use of metal ceilings permits of a wide variety of decoration not readily possible by other means. The walls and ceilings must be covered and the use of metal for this purpose renders them practically fireproof, thus adding greatly to the reduction in insurance as well as to the safety of the contents and the building itself. The decoration possible with modern ceilings is such as adds greatly to the appearance and beauty of the room in which it is used with little expense over that of plain walls.

The Edwards Manufacturing Company, 430-450 Eggleston avenue, Cincinnati, O., have just erected new factories with new machinery, especially adapted for the manufacture of embossed metal work. The designs which they show in their latest catalogue indicated that they have employed the best talent in getting up the designs and in the manufacture of the

CHIEF DRAFTSMAN

Will *instruct personally* a limited number of selected, ambitious men in

ARCHITECTURAL Drafting

Earn $125 to $175 per Month

I know you would like to draw such a salary—and more. You **can** and **will** earn this amount ***easy*** when you are a thorough **practical** trained draftsman and designer. The constant demand for trained draftsmen always exceeds the supply. Each week I have calls and requests for practical, trained men. Some weeks over 250 positions from all over the country remain open for want of good practical experienced draftsmen.

Let me send you a weekly list of open positions to prove what I say is true. There is no limit to a draftsman's earning power and opportunity.

For over 20 years I have been doing the highest-paying expert drafting work. I am **Chief Draftsman** of a large and well known company. At this time I can accomodate a few more men (from the ages of 16 to 40) in my spare time. If you will write me at once I will send you my book "Successful Drafting" with full particulars — **All Free.**

FREE!

This $15.00 Drawing Outfit

To Those Who Write Me At Once

Because of the urgent demand for more and better men in the drafting field, I will give you ***absolutely free*** this $15.00 drawing outfit, if you enroll right away. As chief draftsman of a big engineering firm, I know exactly the Quality and Quantity of **practical** training—knowledge and actual up-to-date experience you must have in order to obtain a good position, and advance to the highest salary. This is ***not*** a correspondence school — I give my students "personal instructions."

FREE Position Paying $125 to $175 per Month Guaranteed

Yes, I guarantee to instruct you until **competent** and **placed in a position** at a salary of $125 to $175 a month. I make this liberal offer because I **know** just what I can do for you. There are so many practical draftsmen needed now that I am willing to give you the most liberal terms. The nominal charge that I make for my personal instruction you may pay as you wish—just a little at a time.

Mail This Coupon Just put your name and address on this coupon and mail it today for my valuable book "Successful Drafting" and full particulars. No obligations on you whatever. Let me tell you what I can do for you, Sign and mail the coupon today.

Chief Draftsman, Div. 1678
Engineer's Equipment Co., Chicago, Ill.

TEAR OFF, SIGN AND MAIL THIS COUPON — FREE COUPON

Chief Draftsman
Div. 1678, Engineer's Equipment Co. (Inc.), Chicago, Ill.

Dear Sir:—Without any obligations on me whatsoever, please mail your book "Successful Draftsmanship" and full particulars of your "Personal Instruction" offer to a few men.

Name.....

Address.....

This Book Is Absolutely FREE

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

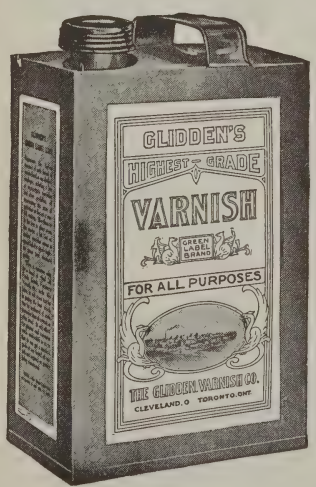
THE QUALITY OF

Glidden

Green Label Varnishes

is what makes them wear well long after ordinary varnishes are well worn.

We do not expect any reader of the National Builder to take this statement on faith.



All we ask is an opportunity to demonstrate the supreme quality and wearing properties of Glidden's M. P. Durable Floor,—the Dreadnought of floor var-

NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

nishes,—Glidden's M. P. Durable Exterior,—the spar varnish without a rival,—and Glidden's M. P. Durable Interior,—the unmatched varnish for interior woodwork.

Let us send you *free* demonstrating samples of any or all of these grades.

We want you to test them and compare them to other varnishes intended for the same purposes.

Comparison has sold more Glidden's Green Label Varnishes than any other one factor. ***Write us today.***

The Glidden Varnish Co.

Factories: Cleveland, Ohio — Toronto, Canada
Branches: New York Chicago London

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

dies and machinery. A large number of designs in various styles are shown for both ceilings and side walls, the details of the designs harmonizing with the best accepted styles of ornamentation. As a mere illustration of the different styles would be inadequate to represent their work, they have included a large number of interiors showing their work installed, these include stores, banks, factories, theaters, etc., as well as residences, and indicate the wide use to which metal paneling can be employed.

The catalogue also contains directions for measuring for ceilings and side walls, as well as directions for applying the sheets.

This catalogue should be in the hands of every contractor as there are so many places where metal work of the character manufactured by the Edwards Manufacturing Company can be used to advantage.

CANNON BALL HANGERS.

Probably no part of the barn equipment meets heavier service than the doors. As these are often large to admit a loaded hay rack, it is necessary that the hangers be designed to properly do their work. During the winter months there is frequently an accumulation of ice and snow around the doors which makes their operation difficult and brings a heavy additional strain upon the hangers. The momentum of a sliding door must be checked practically by the hangers and for this reason also the design of the hangers must be carefully considered.

Hunt, Helm, Ferris & Co., 6587 Hunt street, Harvard, Ill., believe that their Cannon Ball Hanger is particularly well designed to meet the requirements of the modern barn. It is claimed to be frictionless and noiseless. The design includes long roller bearings, steel trussed frames, special steel ball wheels and a circular track which is both waterproof and bird-proof.

The same company manufacture a hanger of similar construction for sliding doors in residences. These hangers possess unusual adjustments and can be put up and adjusted with much less labor than many of the old style hangers.

The complete catalogue of Hunt, Helm, Ferris & Co., shows a large number of appliances for the modern farm such as hay carriers, steel stalls and stanchions, wire stretchers, hoists, tank heaters, ladders, etc.

This catalogue should be in the library of every contractor who numbers farmers among his clients.

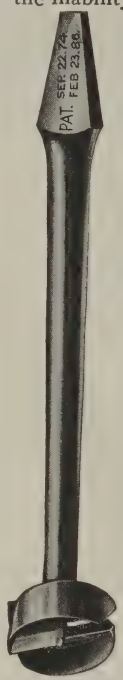
AN ARCHITECT'S RECORD BOOK.

The difficulty of keeping track of the many details about a building has lead Mr. Geo. F. Sansbury, an architect of Cumberland, Md., to design a record book for architects, giving a simple, economical, practical record of the details and costs of building operations. This form is in the shape of a loose leaf ledger by which any building can be readily referred to and when finished can be transferred to a permanent file. Every architect and contractor who has a number of buildings to look after should have one of these record books as it will greatly simplify his work in keeping track of the various details.

A sample leaf will be sent on request to Mr. Sansbury.

THE FORSTNER AUGER BITS.

Every carpenter has at times been troubled by the inability to keep a bit true to line when boring in hardwood, knots or close to the edge of a board. Various expedients have been tried to overcome the tendency of the center bit to run off in work of this kind, but they are all more or less makeshifts and unsatisfactory.



The Forstner auger bit, made by the Progressive Manufacturing Company, Torrington, Conn., is different from other bits in that it is guided by the rim instead of by the center. In consequence it will bore any arc of a circle and can be guided in any direction regardless of the grain of the wood or knots and leaves a true polished surface. It is preferable to and quicker than a chisel, gauge or scroll saw for core boxes, fine and delicate patterns, veneers, screen work, fancy scroll columns, newells, ribbon molding, mortising, etc.

The Forstner auger bit is made in a large number of sizes as well as having a shank for the ordinary brace or for machine work.

The Forstner auger bits are for sale by practically every dealer in the country, but the Progressive Manufacturing Company would be glad to send to carpenters, contractors, dealers, etc., their complete catalogue showing the numerous labor-saving tools which they manufacture.

PLUMBING AND STEAM SUPPLIES.

The latest catalogue of B. Y. Karol, 768-72 West Harrison street, Chicago, Ill., contains a great deal of useful information to the contractor considering the installation of modern plumbing and lighting systems in the buildings which he erects.

Mr. Karol has been selling plumbing and lighting goods to contractors for many years and his reputation for prompt shipment and accuracy in the filling of orders has won him and kept him many good customers. His broad guarantee of being perfectly willing to refund the purchase price on any materials not found satisfactory is assurance that no imperfect or unsuitable goods or materials will be shipped. A request to Mr. Karol for his latest catalogue will be met with a prompt response and any order intrusted to him will be faithfully executed.

BIRCH
AMERICA'S FINEST WOOD

¶ **BIRCH** timber reaches its best development in Wisconsin and Michigan. The trees are large, symmetrical, clear and sound, yielding lumber of the highest quality. The wood is close-grained, with a fine figure, tough and strong. It does not mar easily, shrink, or warp out of place.

¶ The sapwood of **BIRCH** is nearly white, the heartwood light to dark-reddish brown, from which comes the beautiful **RED BIRCH** that has no superior in even the costly imported woods. Both sapwood and heartwood takes stains so easily and permanently that every effect from soft silver gray to the warmest red is readily produced. **BIRCH** gives especially good results with white enamel, while a finish in the natural color of the wood itself is very attractive.

¶ Although **BIRCH** is used for a great diversity of purposes—the Government Reports list over 150—it is above all a high-grade (but not expensive) furniture and finishing wood. The reception room, the living room, the dining room, the den, the cosy corner, the fireplace nook, and the sleeping room can each be given an appropriate individual aspect by the use of **BIRCH** and yet all be in perfect harmony.

¶ Our **BIRCH BOOK** shows by accurate sketches and illustrations how **BIRCH** can be artistically used in modern houses, apartments and office buildings. The book and a sample of **BIRCH** in stained and natural colors will be sent postpaid upon application to Department **D**

NORTHERN HEMLOCK
& HARDWOOD MANUFACTURERS ASSOCIATION
WAUSAU, WIS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

REINFORCED WALL BOARD.

The perfecting of a reinforced wall board for use in covering the walls and ceilings of permanent buildings is the result of long study and experiment on the part of Mr. Allison Bishopric, general manager of the Mastic Wall Board & Roofing Company of Cincinnati, Ohio. This board as perfected by Mr. Bishopric consists of toughened asphalt mastic in which are embedded kiln dried dressed lath. The mastic is non-burning and the laths are pressed into the hot material under a

Mr. Allison Bishopric, General Manager Mastic Wall Board & Roofing Company.

pressure of 500 pounds to the square inch. Over this is pressed a surface of heavy sized fiber board. The lath gives permanent solidity to the wall and the mastic and board insures a solid impenetrable surface.

Bishopric wall board is made in sheets four feet square, this size being as large as one man would care to handle and as large as can be used to advantage in ordinary places. In fact, it can be erected in less time and with less labor than a sheet of twice its size and where cutting or fitting is necessary the advantage of a smaller sheet is at once apparent.

A great advantage in the use of Bishopric wall board is that it can be put up by carpenters as soon as the frame is ready for it and after it is in place there is no delay waiting for plasterers, lathers, etc. The dampness and dirt is entirely eliminated and the decorators and finishers can proceed at once. In fact, the decorators can start practically as soon as the carpenters do. This means a great saving in time in the erection of a building.

There is practically no limit to the places in which Bishopric wall board can be used. It is found in walls and ceilings in fine homes, country clubs, schools, churches, hospitals, bungalows, garages, stores, and, in fact, all kinds of buildings where walls of beauty and permanence are necessary. The low cost of the material with its low cost of installation makes it a favorite material for repairs and temporary work, as it can usually be taken down and used over again in places of this character.

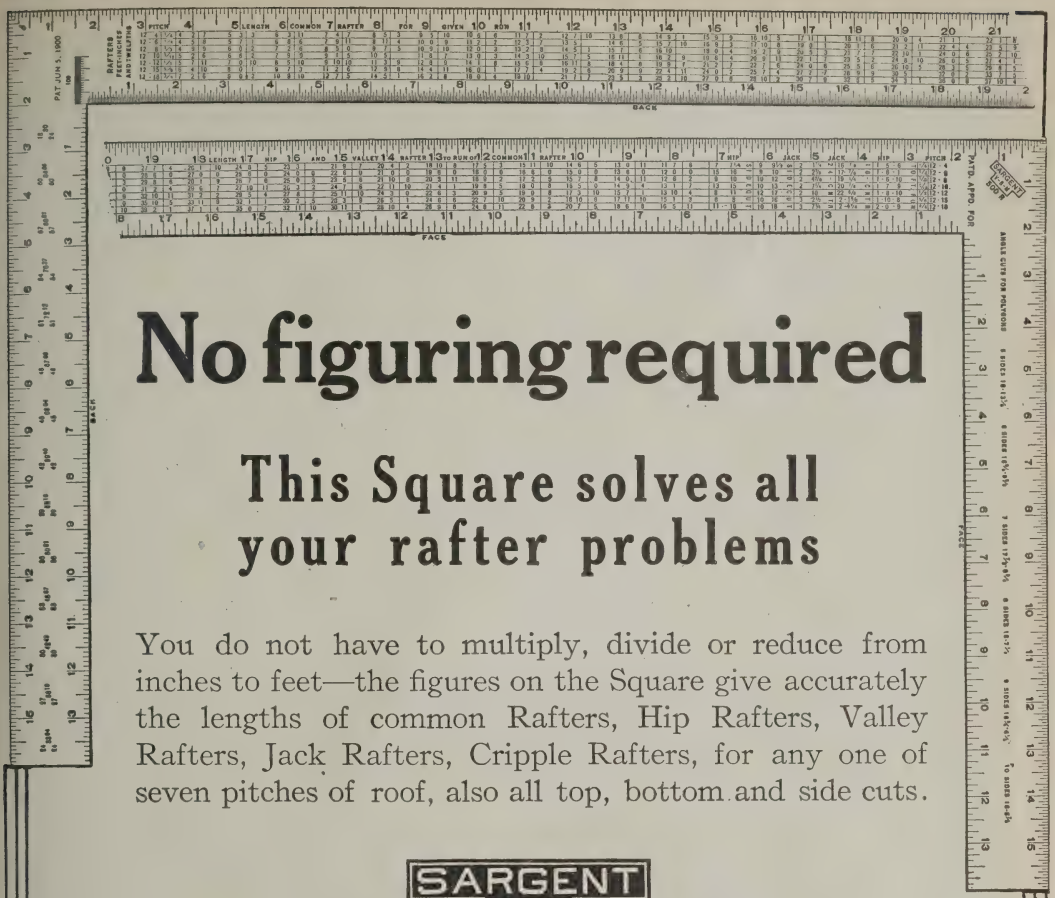
Every contractor or carpenter who uses Bishopric wall board seems to find new uses for it which the originator did not realize at the start. It has been proven that feed bins and corn cribs lined with this material are not only stormproof, but are rat and vermin proof as well. The average farmer being a more or less ingenious individual, therefore uses it in a great many places about the farm.

The Mastic Wall Board & Roofing Company, 334 Este avenue, Cincinnati, Ohio, who are manufacturing this board, are conducting an extensive educational campaign in the interests of carpenters, builders, contractors and home owners, it being their intention to let everyone know of the advantages in using this material. To introduce its use in every community samples and complete information are sent to every inquirer who writes for prices. The big Bishopric book containing a duplicate of their famous $5,000 anti-warp bond guarantee and blueprint plans of a model home are sent to carpenters, contractors and dealers, as well as to their patrons. In this way the material is being widely advertised and its use being greatly extended.

The use of Bishopric wall board in one house almost invariably leads to its use in others, for as soon as one sees the waste space which it makes available, others realize that the same results could be obtained in their homes as well.

It is the aim of the Mastic Wall Board & Roofing Manufacturing Company to supply this material through the local dealer. As, however, it frequently happens that there is no dealer in the town where the inquiry comes from, the Mastic Wall Board & Roofing Manufacturing Company are prepared to send the material direct from the factory.

It is suggested that those who are in a position to take advantage of the generous terms offered by the Mastic Wall Board & Roofing Manufacturing Company to dealers and agents that they write to them for a definite proposition regarding exclusive agency. When this is done all the inquiries in that territory are referred to them and in this way the home company greatly assists the local agent.



No figuring required

This Square solves all your rafter problems

You do not have to multiply, divide or reduce from inches to feet—the figures on the Square give accurately the lengths of common Rafters, Hip Rafters, Valley Rafters, Jack Rafters, Cripple Rafters, for any one of seven pitches of roof, also all top, bottom and side cuts.

SARGENT
V·B·M

Rafter and Framing Square

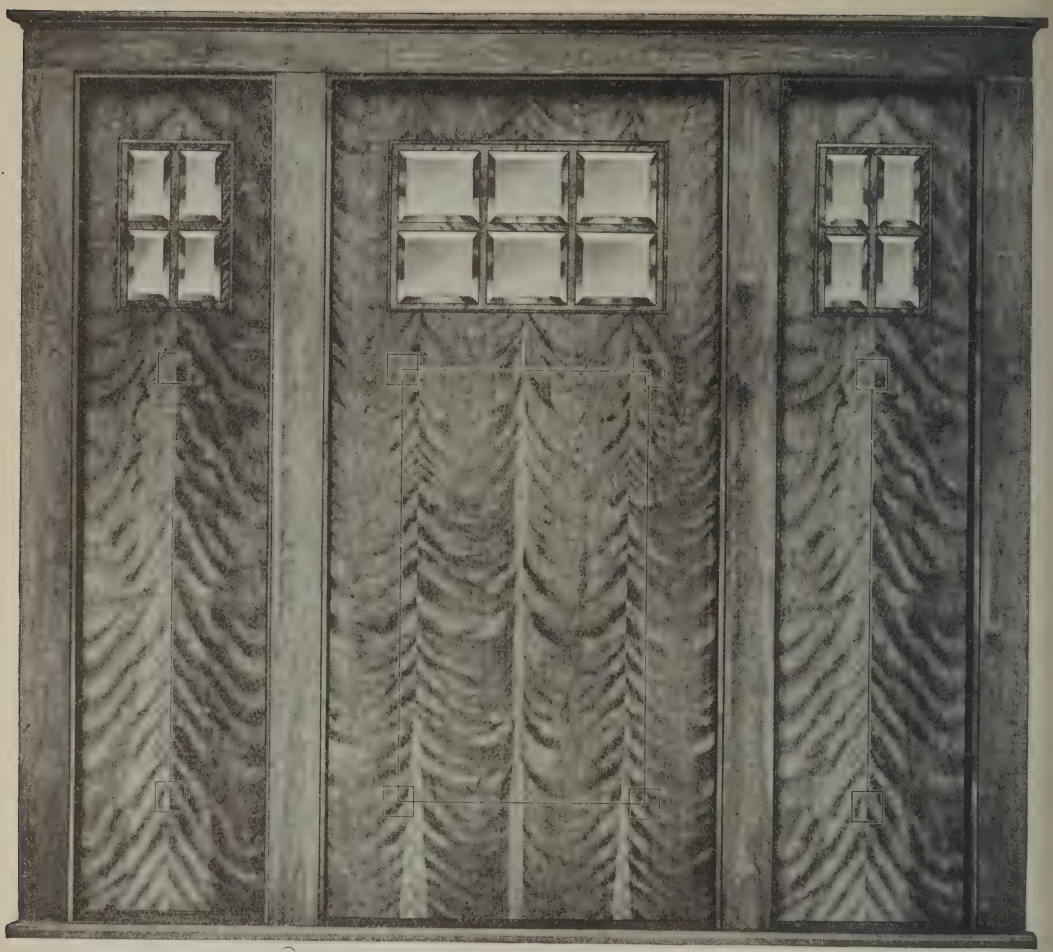
is an invaluable tool—a time-saver for busy mechanics. Errors are avoided as there are no calculations to make and the figures on the Square are guaranteed to be accurate.

For full description see the Sargent Square Booklet, sent free on request. Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics, sent on application.

Sargent & Company, Manufacturers, 1151 Leonard Street, New York

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT. BUILDER



THE HOUSE THAT JACK BUILT.

This cut shows a bungalow entrance in the mission style adapted to most of the modern bungalows, which are proving so popular all over the country.

This cut is taken from "The House That Jack Built," one of the recent publications of the Paine Lumber Company, department Z, Oshkosh, Wis., which shows the value of birch as a hardwood finish for moderate priced houses. The book contains exterior and interior views of a house recently built, on which birch trim was used at a slight expense over common materials, but which greatly increased the value of the building, both to the owner as a place of residence and to a prospective purchaser should he ever wish to dispose of the place. This book is sent free to readers of the NATIONAL BUILDER on request to department Z of the Paine Lumber Company.

THE LITTLE BLUE FLAG.

Climatic conditions in the United States require paints which shall protect the house from the sun's heat, from the rain and snow, and not only protect the materials, but keep their color and luster.

The Lowe Bros. Company, 473 East Third street, Dayton, Ohio, have been manufacturing prepared paints for many years under the name "High Standard," their trade mark being "The Little Blue Flag" with the initials "H. S." These paints have been used in all places where they were subject to severe conditions and have given most excellent satisfaction.

The free booklets and color cards, showing not only exterior paints, but interior varnishes, enamels, etc., for every purpose will be sent to those interested in the best finish for their home or the homes they are building for others.

Which wrist will do the most work?

The
ATKINS
Perfection Handle

TRY this for yourself. Run a straight line from your elbow, down thru your wrist and thru the saw blade. If it is a Perfection Handle you will find that the line comes out on the cutting edge—every ounce of pressure is directed at the proper point. If it's the old style handle you will find the line comes out on the top of the back of the saw. See the idea?

WE MAKE BOTH KINDS

If you still prefer the OLD STYLE HANDLE, then ask the clerk for ATKINS SILVER STEEL with old style handle. He will know—or you can easily see for yourself.

HOW MADE

Both have the same advantages as to scientific construction. Both are made of SILVER STEEL—both are taper ground. Manufactured in the largest exclusive saw factory in the world by the highest paid, most skilled mechanics.

THE PERFECTION

But if you would prefer the latest pattern (exclusive with Atkins)—then ask for the Perfection Handle.

OUR FREE OFFER

Send ten cents to pay postage and receive a package full of useful information about Saws and our free nail apron.

Ask your dealer for SILVER STEEL SAWS—he will get them for you if he does not carry them in stock. If he won't—let us know.

E. C. ATKINS & CO., Inc. Indianapolis, Indiana.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Big New Builders' Catalog—Free

Order All Millwork Staples and Specialties Direct from Gordon-Van Tine Co. Save 50%

The great new Building Material Catalog we have just issued fairly bulges with bargains for carpenters and contractors.

Over 5,000 money-saving offers on staple items in Millwork and specially designed styles, meeting every possible requirement of the builder.

Over 152 solid pages, each packed with high grade materials at prices that defy competition.

We guarantee highest quality, prompt shipment, safe delivery and satisfaction or agree to refund every dollar and pay the freight both ways. Write for your catalog today and save 50 per cent.

Where Can You Beat These Prices on Staple Items of Building Material?

White Pine Doors—2′ 8″x6′ 8″, 1⅜, 4 panel, Strictly "A" Quality, each	$1.79
Yellow Pine Doors—2′ 8″x6′ 8″, 1⅜, 5 panel, Strictly "A" Quality, each	1.95
Windows—4 lts., 1⅜, glazed, 10x22, SS, each	.72
Windows—2 lts., 1⅜, glazed, 16x22, SS, each	.63
Storm Sash—2 lts., 1⅛, glazed, 16x22, SS, each	.65
Storm Doors, Glazed and Painted, 2′ 8¾″x6′ 9″, 1⅛, each	1.71
Yellow Pine Base Moulding, Size 13/16x2¼″, per 100 lineal feet	.83
Lattice, per 100 lineal feet	.30
Yellow Pine Cove Moulding, per 100 lineal feet	.30
Outside Window Frames complete, for 10x20, 2 lt., each	1.18

GORDON-VAN TINE CO. 632 Federal Street DAVENPORT, IOWA

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

5,000 BARGAINS

Why Pay the Planing Mills to Make What We Carry as Regular Stock?

We offer *at a mere fraction of usual "made-to-order" prices* an immense variety of new style, specially designed Doors and Windows, Casement Sash, Stair and Porch Material, China Buffets, Mantels, Grilles, Consoles, Colonnades, French Windows, Doors, etc., etc.

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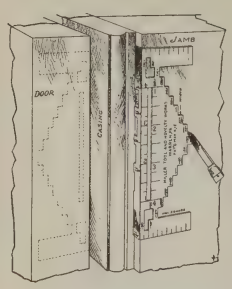

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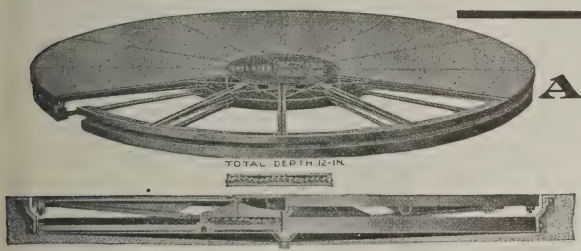

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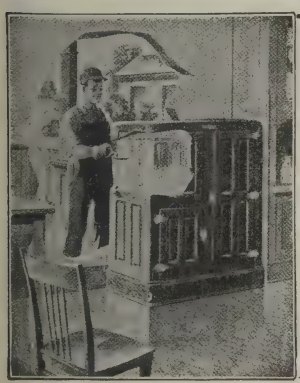

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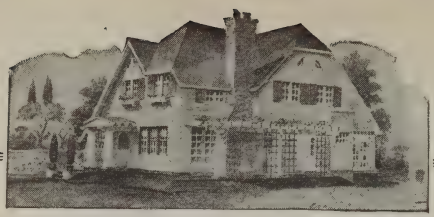

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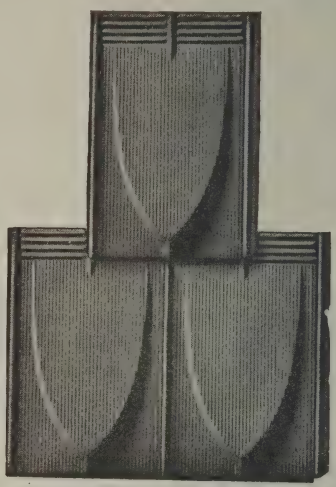

Titelock Metal Shingle.

shingles prevents any fire getting through to and endangering adjoining buildings. In fact, there are instances where the entire roof boarding has been burned away while the shingles remained in position intact.

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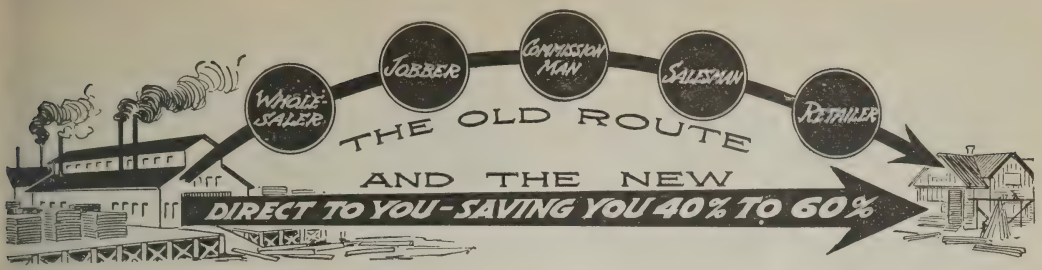

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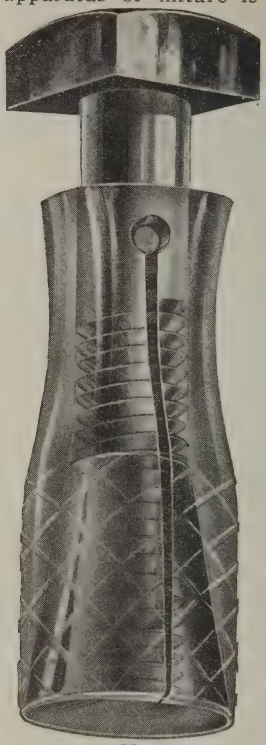

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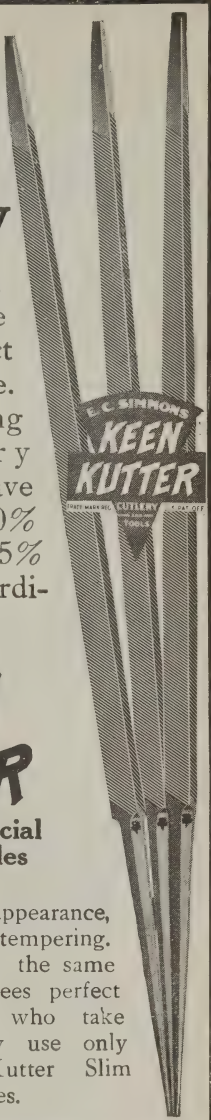

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Rollin S. Tuttle, Architect, P. O. Box 3242 **Boston, Mass.**

Are You Going to Build?

Send 25c in silver (and 10c postage) for our big $1 book of plans. **"LOW COST MODERN HOMES,"** with houses from $1,000 to $3,000.

"PALATIAL MODERN HOMES" from $3,000 to $10,000, price 25c and 12c postage.

"COTTAGES AND BUNGALOWS" from $300 to $9,000, price 25c and 5c postage.

J. H. DAVERMAN & SON, Architects
1342 Murray Building - - - GRAND RAPIDS, MICH.

SYMPLIST STEEL SASH FIXTURES.

This fixture consists of three different parts which are all that is necessary to fit up a sash to a weight. As will be seen from the cuts, the operation of attaching them is extremely simple, it only being necessary to cut a round hole in the sash. The special link is passed through the end of the sash chain, inserted in the slot and turned. When once in place

and in operation there is no possibility of its getting loose or out of order.

The Niagara Falls Metal Stamping Works, Niagara Falls, N. Y., manufacture these fixtures and describe them in catalogue No. 57-B, which also contains descriptions of their well-known specialties, such as galvanized wall plugs, Premax sash chain, sash pulleys and wall ties. This catalogue is sent free on request and is of interest to every contractor, as he can then be posted on the latest designs in fixtures of this character.

COMPLETE HOMES.

The many erroneous estimates which have been given from time to time by irresponsible writers in the numerous popular magazines have led to curious results. The intending builder either believes it is possible to get a complete $3,000 house for $2,000 or he believes that the $2,000 house which he contracts for will swell to $3,000 before it is fit for occupancy. Both of these impressions work hardships on the legitimate builder or estimator. It puts a premium on misrepresentation and handicaps those who would deal honorably with their clients.

It is not alone the irresponsible estimates of the complete buildings, but the misleading figures for equipment which causes trouble. The intending builder is not able to distinguish betwen a low-priced piece of equipment, which would be unsatisfactory, if installed, and which is only half of the necessary outfit, and a complete outfit to do the work properly.

To overcome these troubles to the builder the Chicago Housewrecking Company have

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DOMINANT REASONS No. 2

Kno-Burn Has No Corrugations

or ribs. This makes the application of the plaster and the complete embedment of the lath easy and certain.

The **residence** shown above is one of two built some years ago near Cohasset, Mass Both houses are now close to the water and exposed to the salt air. KNO-BURN GALVANIZED LATH was used as a base for the stucco and both architect and builder report **absolutely no deterioration to date.**

This is one of the reasons why

Kno-Burn

Expanded Metal Lath

dominates the field.

Other reasons will be given in subsequent advertisements—if you want them at once write for Booklet 53, describing KNO-BURN STEEL LATH in detail.

Fire-Proof—Non-sagging—never Disintegrates—Galvanized after expansion or coated with highest quality carbon paint—these are a few points of KNO-BURN superiority.

20th CENTURY LATH is a special acid-resisting metal lath of the same mesh as KNO-BURN. Send for 20th Century Lath Booklet 54. It tells you how to test different metal laths for acid-resisting qualities.

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Mills at CHICAGO, ILL., and JEANNETTE, PA.

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50 CENTS FOR THIS GUARANTEED CLAMP FIXTURE

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The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

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WITH POSITIVE GAUGE

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OVAL HEAD. 169 POINTS.

Gauges by ¼ inches from 4¼ inches to 5½ inches. Full Polished Solid Tool Steel, the best Quality ever used in a Hatchet.

If your dealer does not carry these Hatchets we will send you one, express prepaid, upon receipt of $1.75.

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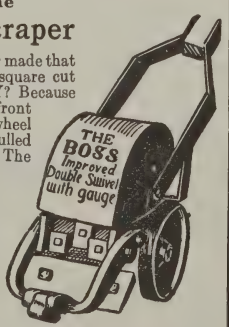
The Boss Floor Scraper

The Boss is the only Floor Scraper made that will plane a floor without leaving a square cut where knife first starts cutting. WHY? Because the Boss is made with a gauge on front to which is attached a pear shaped wheel which raises when the machine is pulled and lets the knife down gradually. ¶ The Boss can be set for any thickness of shaving. It also can be set for any shearing cut; right or left, up or down, to suit the kind of lumber. ¶ It is guaranteed to give absolute satisfaction.



G. J. KEPPLINGER

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MANUFACTURED ALSO IN CANADA

gone to great expense in preparing a complete book of plans, which contain floor plans and photographic views of exteriors and interiors of a large number of moderate priced homes.

A feature of this book is that it not only gives the complete estimated cost of the house, but it gives the price of all the materials necessary to complete the house. This makes it possible for the owner to know exactly what the material or the finished house will actually cost him, as the guarantee of the Chicago Housewrecking Company assures him that no items will be omitted, the complete list of the materials being included.

This plan book is sent free by the Chicago Housewrecking Company on application to department F-63, Chicago, Ill., and it should be in the hands of every prospective home builder. Should it be found that the plans as shown in the book are not sufficiently complete, blueprints and specifications can be readily obtained and the small price paid for these will be refunded on the first order.

The Chicago Housewrecking Company, besides selling complete bills of materials for houses, are in a position to quote very low prices on special equipment, such as heating plants, plumbing plants, water systems, etc.

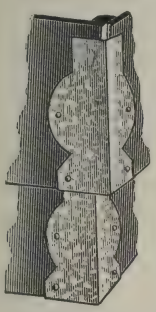
"LAKE LEVEL" PLUMBS AND LEVELS.

The most important thing about the operation of a plumb or level is for the operator to secure a good full view of the spirit glasses. In the levels made by Mayes Bros., 694 Medbury avenue, Detroit, Mich., this principle is especially well taken care of. In most of their levels there are four or more glasses, thus insuring far greater accuracy than where there is a smaller number. The value of a level is gauged by its accuracy and its tendency to remain accurate. Those made by Mayes Bros. are of very old selected white pine, light and durable, the finished stock being left in the factory from six months to a year to insure it against any variation due to climatic conditions.

Further superiority is plain from the way the glasses are set, there being practically no chance for a fall or jar to move or break them. The glasses are all wired, which shows the bubble accurately and readily. Over the whole is placed a heavy lens, further protecting the glasses and adding greatly to the comfort of the operator when making a reading. The complete line made by Mayes Bros. contains plumb and levels for practically every purpose. While many dealers carry these levels in stock, a complete catalogue with prices, etc., can be obtained direct.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

More Profit For You.



You can now give your customer the popular mitre-corner effect without the slow, careful work of cutting and fitting bevels.

Use Metal Building Corners

They take the place of corner boards. Save fully $2 worth of time in finishing each corner, make a stronger and neater job.

WRITE FOR FREE SAMPES TODAY.

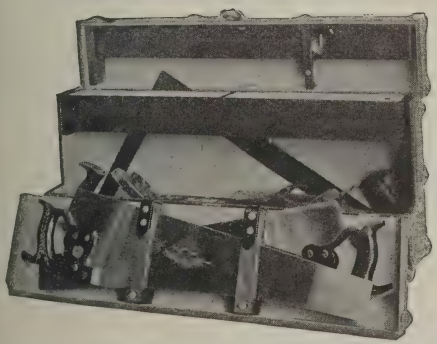
F. D. KEES MFG. CO. BEATRICE, NEB. Box 811

If you've never used Gossett Hinges for full length window screens, say so and we'll send you a sample pair free.

Don't Lug a Heavy Tool Box Around But

CARRY YOUR TOOLS IN THE INDESTRUCTO

CARPENTERS' TOOL CASE



It is made in suitcase style—of three-ply veneer, covered with strong canvas and painted, all edges bound in steel, reinforced corners, secure locks and catches and strong handle. The Indestructo is the handsomest tool case manufactured. It is light, very strong, and the inside is so well arranged with separate compartments for saws, planes, level, square, chisels, bits, etc., that the cutting edges cannot be injured. Tools can be quickly found and put away. It is made in two lengths, for 26 and 28 inch saws. Special sizes to order. Send for prices.

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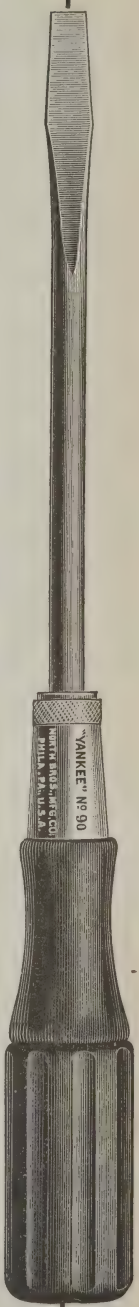
Sole Manufacturers

157 Jefferson Ave, Detroit, Mich.

Another New "Yankee" Rigid Driver No. 90

14 Sizes

A strong, durable, and well-balanced tool, of the same high quality as other "Yankee" Tools, which today are without equal. The blade and ferrule are highly polished, the handle of hardwood, finished in dull black, making a handsome appearance. Each tool is thoroughly tested, and the blades are positively guaranteed not to turn in handle.



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North Bros. Mfg. Co.

Dept. N

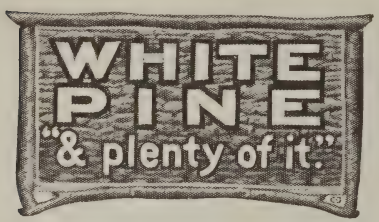
Philadelphia, Pa.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS IT WILL HELP.

Good Carpenters Know These Good White Pine Facts

OTHER FOLKS ARE RAPIDLY LEARNING.

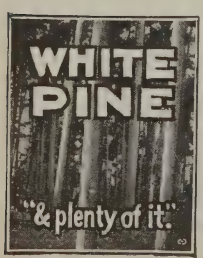
And don't forget that notwithstanding the known **superiority** of WHITE (and NORWAY) Pine and the tremendous quantities of it used,
there is still "plenty of it."
there is still "plenty of it."



there is still "plenty of it."
there is still "plenty of it."
there is still "plenty of it."

Mr. Carpenter:—

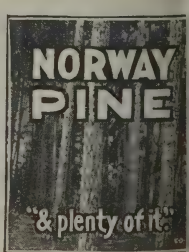
We will give you the names of reliable dealers who will furnish at fair prices *all the WHITE (and NORWAY) PINE you want, with quick deliveries assured.*



WRITE US FOR COPY OF NEW FREE BOOK "WHITE PINE VALUE IN HOME BUILDING."

You will find it full of valuable ideas about how and why to use White Pine in ***YOUR*** NEW HOME. You can't afford to "go it blind" on this question. Write today for your copy of entirely NEW booklet.

NORTHERN PINE Mnfctrs.' Assn.,
1118 Lumber Exchange Minneapolis, Minn.



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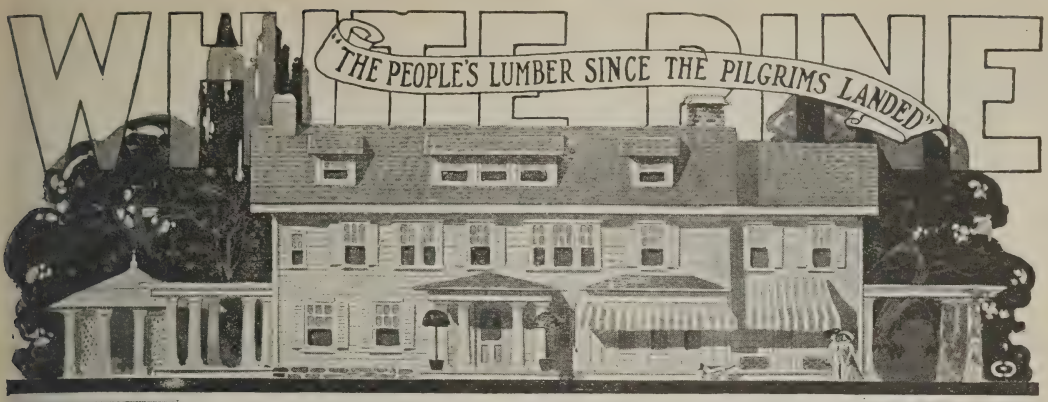

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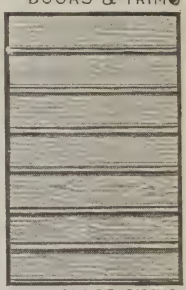
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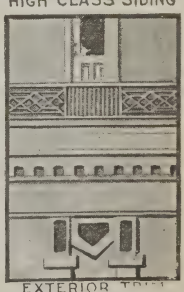

EXTERIOR TRIM

Insist upon White Pine for Your House

("The Wood America is Mostly Built of.")

The predominant use of White Pine in home building for more than 250 years demonstrates conclusively that this is the one wood chosen by the best judges for

Siding, Sash, Doors, Stair Railings, Exterior Trim, Pillars, Cornices, Pergolas.

Your carpenter will tell you it is the most *workable* wood. Your painter will tell you how well it takes and holds paint. Your own eyes will convince you of its beautiful texture, grain and finishing qualities.

The evidence of centuries of use (in buildings still standing) *proves* its durability.

Norway Pine, (the half-brother of White Pine) is the only wood that is "as good as White Pine" for most uses.

For sturdy, structural members of a house, such as roof-boards, studding, joists and sills, and for screen-doors and windows, Norway Pine is *ideal and its Cost is Low.*

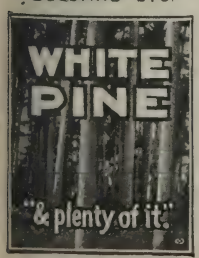
The *kind* of wood you use is one of the most important factors in home building. Your architect will tell you how notably good White Pine is for all its proper uses.

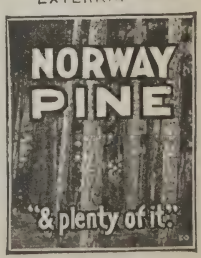
Wherever carved wood-work is desirable, as in grilles, newel-posts, panelling, colonial pillars—White Pine is supreme — just as it has been for 250 years.

AND THERE'S "PLENTY OF IT" YET.

WRITE US FOR COPY OF NEW FREE BOOK "WHITE PINE VALUE IN HOME BUILDING."

You will find it full of valuable ideas about how and why to use White Pine in ***YOUR*** NEW HOME. You can't afford to "go it blind" on this question. Write today for your copy of entirely NEW booklet.





NORTHERN PINE Mnfctrs.' Assn.,
1118 Lumber Exchange Minneapolis, Minn.

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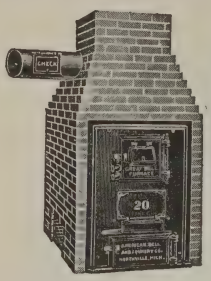

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For Less Than $50 Complete
FOR 5 AND 8 ROOM DWELLINGS

An unheard of Price and a most Remarkable and Indestructible Furnace. No Pipes—no Lost Heat.

American Bell & Foundry Co.
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PEERLESS ROCK MAPLE FLOORING

The highest grade of seasoned Rock Maple Flooring made. It makes a perfect floor—the kind that builds the Contractor's reputation for high class work. "Peerless" flooring is also carried in Beech and Birch. Specify "Peerless" if you want complete satisfaction.

The Northwestern Cooperage & Lumber Co., GLADSTONE, MICH.
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A book for the man who has to do the work. Written by a practical pattern maker of many years' experience. Gets right down to business in the first chapter and keeps it up throughout the book. Full of kinks and actual working information. Profusely illustrated. Every one following this trade, or intending to learn it, should have a copy of this valuable book.

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In preparing this book the author has studied to make the subject matter so clear and concise that the average layman can readily comprehend the principles that underlie the practice of plumbing. Architects and Engineers, as well as Plumbers and Builders, will find it a book of great assistance to them.

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That is what the Oshkosh Manufacturing Company claims for their saw rig. Their one effort has been to make it not only a mere saw rig, but a machine that could be made to do all of the more frequent planing mill jobs. To accomplish this a full set of extra attachments is given free with it. In addition to a crosscut and a rip saw, these devices are included:

A Jointer Head that works on the plan of a first-class planer; a fine tool, 2½ inches in size, that does smooth, nice work with no deep cut as the stuff leaves it.

A Boring Attachment to take bits of standard size, that fastens directly into the arbor itself.

A Jig Saw, 12-inch size, heavy and durable, made to stand up under the hard sawing actual carpenter work requires.

A Sander, 10 inches in diameter, that has an entirely new method of holding the paper. This grip, the makers assure us, prevents paper-blisters and is very much more saving than the old styles.

A Dado Head of a special design of toughest saw-blade steel that can be procured.

An Emery Wheel, 6-inch size, an 18-inch Saw Gauge and an Adjustable Mitre Device.

The makers inform us that these devices are not flimsy attachments, gotten up just to give the "Eveready" Saw Rig a bargain look, but that much money, time and study have been expended to give the purchaser an excellent outfit that will never go back on him. Great care is being taken in their advertisements to impress upon him also the conscientious manner in which the "Eveready" and its attachments are sold.

"Guaranteed for Life" is their slogan and they have assured us again and again that they mean every word of it. They are so confident of the sterling quality of their saw rig that they will let any responsible carpenter or contractor put it into actual, every-day use for a whole week, and then take it back, with no charge for the trial, if he thinks he can get along without it.

Those who are interested in saving time and money can get full particulars of this offer by writing Oshkosh Manufacturing Company, 414 South Main street, Oshkosh, Wis.

THE INCREASING USE OF BEAVER BOARD.

One of the most interesting developments in recent years in the building field has been the rapidly increasing use of beaver board for walls and ceilings.

This fact coupled with the extensive advertising of the Beaver Company of Buffalo has brought its merits prominently before carpenters and builders everywhere.

It is now generally well understood that this is a pure wood fiber product, forming—when put up and decorated—a complete wall in itself, permanently displacing lath, plaster and wallpaper.

It is one of the most convenient of all mate-

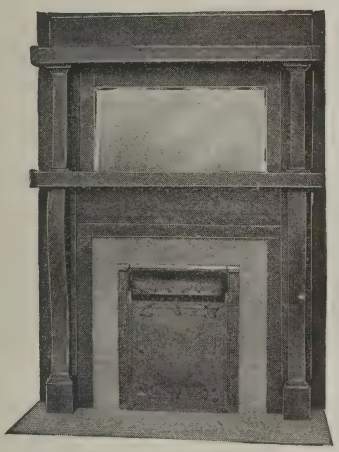
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

$28.60

For this Elegant, Massive Selected Oak or Birch

Mahogany Finished Mantel

Beveled Mirror, 18x36 inches



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"FROM FACTORY TO YOU"

Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns as shown in cut. **Dealers' price not less than $40.00.**

"Reputation and Quality Count"

CENTRAL MANTELS

are distinctive in workmanship, finish and style. Twenty-five years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

CATALOGUE FREE. Will send our new 100-page catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

Central Mantel Company

1237 Olive Street St. Louis, Mo.

Bay State
Brick and Cement Coating

Will protect all concrete or cement construction against damage by moisture, will retard fire, give your building any tint desired, may be used as a tint on brick or wood, is equally advantageous on stucco or concrete houses, in mill, bridge or sewer construction. *Send at once for Booklet No. 10.*

IT WAS USED HERE

ARCADY FARM
Country residence of Arthur Meeker, Everett, Ill.
Exterior coated with Bay State Brick and Cement Coating
Recommended by R. C. Clark, Archt. for Armour & Co.

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PAINT AND VARNISH MAKERS AND LEAD CORRODERS

82-84 Washington Street BOSTON, MASS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Direct from the Manufacturer

A Wonderful Paint Offer

If any of your buildings need painting, write at once for our free paint sample offer. We sell the best ready mixed paint in the world at lowest prices ever heard of—65c a gallon for the best Barn Paint, $1.15 a gallon for the finest House Paint in quantities. We pay the freight charges. **Guaranteed for Ten Years.** We furnish full directions how to do any job, and just now we are making a surprisingly liberal offer. Write at once and get this great paint offer, *free shade samples*, strong testimonials and valuable paint information. Just say "Send me your latest paint offer." Address

Crosby-Frank & Co. 297 Peoria Street, Chicago, Ill.

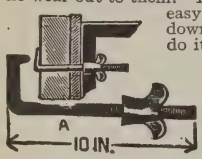
$13.95 PER DOZ.

(If You Send Cash With Order)

The Taylor Steel Scaffold Bracket

Absolutely Safe,

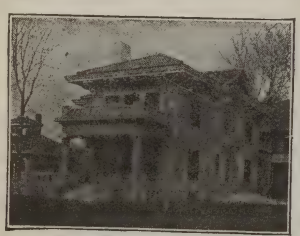
for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.



Write for Catalog of Builders' Specialties

James L. Taylor Mfg. Co.
Poughkeepsie, N. Y.

143 Cities Used "STONEKOTE" Rough Cast In 1911



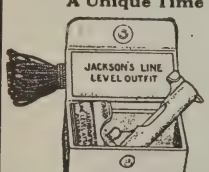
Before you build or repair the old home have your architect write us for book telling of "Stonekote" Portland Exterior. What color would you like a sample to be; Gray, Silver Gray, White, Buff, Red, Brown?

M. C. Clapp Res., Wichita, Kan.

THE GARDEN CITY SAND COMPANY
MANUFACTURERS
709-11 Chamber of Commerce CHICAGO, ILL.

THE JACKSON ALUMINUM LINE LEVEL

A Unique Time and Labor Saving Device



It takes the place of the old-fashioned sixteen-foot straight edge, yet it can be carried in your vest pocket. ¶ No contractor, builder, carpenter, mason, bricklayer, architect or plasterer should be without one. ¶ Just stretch your line and hang the level on it—it's positively accurate. ¶ The complete outfit is put up in a neat leatherette case and consists of the level with a 40-ft. line, also a spring clamp for attaching the level to a steel square or pocket rule, thereby serving as a plumb rule or bench level. At your hardware dealer's or sent for $1 postpaid. By registered mail 10c additional.

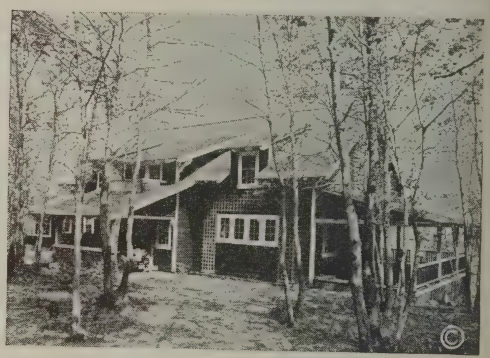
JOS. WOODWELL CO., Sole Agents, 201-203 Wood St., Pittsburg, Pa.
Write for Catalog of Woodworker's Tools

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

rials to handle, inasmuch as it comes in sheets of convenient sizes, which can be cut with a fine saw or knife, like wood, and put up with hammer and nails.

Although it is light in weight and about 3-16 inch thick, it forms a very rigid and durable wall and can be applied direcly to the studding of new rooms or with equally satisfactory results nailed right over the old lath and plaster.

This convenience is a very great advantage inasmuch as it means not only much quicker and cleaner construction in new buildings, but is one of the most economical and



satisfactory means of remodeling any old building, besides doing away with all of the cracking, deterioration, repairs, repapering and other nuisances connected with lath and plaster.

No one who appreciates the advantages of beaver board will ever try to paper it. Not simply because this makes an unsatisfactory job, but because the beautiful color effects produced by painting the unusual pebbled surface of the board are far more pleasing and sanitary than anything that can be done with wallpaper.

This sanitary feature is jealously guarded by the Beaver Company, who use only selected wood reduced to fibrous form and made up in panels of beaver board under tremendous pressure.

The use of new spruce wood entirely eliminates the danger dependent upon the unwholesome coloring matter, disease germs and other injurious elements in all boards that are worked up from old pulp, discarded paper, etc.

The carpenter has good reason for his interest in beaver board inasmuch as it widely extends his field of work, and this is the more impressive in view of the fact that it is all inside work and beaver board can be put up at any season of the year or in any climate.

The possibilities of its use seem to be almost without limit, for while it is undoubtedly an ideal material with which to remodel an attic, fix up a summer cottage, decorate a show window and do a hundred other similar jobs where economy and quick construction is desirable, at the same time it is used in the finest residences throughout and in a great va-

A Little Thing May Get You the Order

A LITTLE thing may get you the contract to build that home—especially when the woman decides. Why rest your whole argument on price? Let the other fellow shave his figures to a point where his bid, if accepted, leaves no profit—but do not do that foolish thing yourself.

Make a price that leaves you something for yourself and then look for talking points to get the contract—especially when the woman decides.

Show That You Are Up to Date

Show that you are a live builder by offering advertised building materials. Look through a magazine like Good Housekeeping and find out what is being advertised. Then tell the man and his wife that you can furnish these things. You will discover that you have struck a new lead.

Here are some of the specialties advertised in Good Housekeeping, the magazine that absolutely guarantees all its advertisements, and which is read religiously by over 300,000 women heads of households of the home buying class:

Standard Guaranteed Plumbing Fixtures
Tuec Stationary Air Cleaning System
Monarch Metal Weather Strip
Sherwin-Williams Paints and Varnishes
Vudor Porch Shades
Maxwell's Lakeside Rug Border
Tyler's Domestic Hot Water Generator
Carpenter's Spring Shades
Wild's Parquet Inlaid Linoleum
Elastica Floor Finish and Kleartone Stains
Brenlin Window Shades
United States Radiators and Boilers
Sargent's Builders' Hardware
Siwelclo Noiseless Closet
Utility Wall board
Sanitas Wall Covering
Beaver Board
Pratt & Lambert "61" Floor Varnish
Vitralite White Enamel
Minneapolis Heat Regulator
Macbeth-Evan's Glass Shades and Globes
Alabastine Wall Tints
Alabasco Fast Wall Paint
Mellotone Wall Finish, High Standard Liquid Paint, Oil Stains (Lowe Brothers)
Imperial Sanitary Flooring.
Valspar

Give the Public What It Wants
It Wants Advertised Goods

The magazine publishes *GOOD STOREKEEPING*, a quarterly devoted to this question of cashing in on the wide demand for advertised products. A copy of it, and a copy of Good Housekeeping Magazine will be sent free on request to any contractor or builder. **Address Dealers Service Department, Goodhousekeeping Magazine, 381-C Fourth Avenue, New York.**

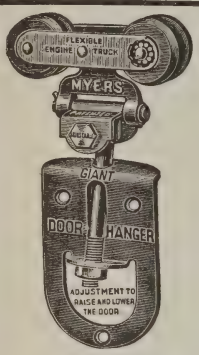
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Wells DIAMOND HARD Maple FLOORING

made from the famous Michigan hard maple by the latest improved machinery and methods. All stock is carefully selected, thoroughly kiln dried, side and end matched, hollow backed, bored for blind nailing and so smoothly polished that it makes a floor of unusual beauty.

Handsomely illustrated book telling all about hardwood flooring mailed free. Specify Diamond Hard and buy it from your dealer. It is right in price and quality.

J. W. Wells Lumber Co.
Menominee, Michigan



MYERS GIANT

and New-Way Adjustable Tendem Door Hangers

PATENTED

For Tubular Girder Track

Are adjustable up or down, and in or out. Trolley Wheels are heavy turned steel, revolving on steel roller bearings, and run inside the tubular girder track. Not affected by rain, sleet or ice. Write for descriptive circulars and prices.

F. E. MYERS & BRO.
ASHLAND, OHIO

WORK BENCHES

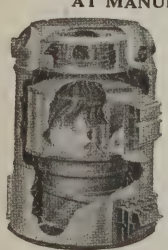
Rapid Acting Vises
Drawing Tables
Drawing Boards
Drawing Cabinets
Electrotype Cabinets

We also make Turnings and Special Wood-work of all kinds to order. Don't buy until you get our Catalogue and prices.

Henry Rowe Mfg. Co. NEWAYGO, MICH.

BOVEE FURNACES

AT MANUFACTURERS' PRICES



Will prove to be very easy to install—durable and the most economical furnaces made. Special prices to Contractors and Builders on our five-room residence heating plants and also on our church and school furnaces.

Specify a Bovee Furnace and install it yourself. It will pay you to do it.

Write for Catalogue N

BOVEE GRINDER & FURNACE CO.
60 8th Street, WATERLOO, IOWA

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

riety of large public, semi-public and commercial buildings.

Illustrations on this page show how appropriate it is to modern residences where good taste and beauty are considered absolutely essential.

While beaver board construction is simple, it is not so easy that anyone can make a good job of it. In fact, an intelligent car-

penter has here a great opportunity for working out a finely finished job that will reflect credit upon his reputation and increase the satisfaction of the owner. The Beaver Company are always very glad to give exact instructions for the handling of any job, and as their long experience covers practically every condition under which beaver board is used, the carpenter who handles it should certainly avail himself of their assistance.

An interesting series of articles on beaver board construction has been running in our advertising pages since last January. The one on pages 4 and 5 is the eleventh in the series, and those who have missed any of the earlier numbers can have them by applying either to us or to the Beaver Company, 452 Beaver road, Buffalo, N. Y.

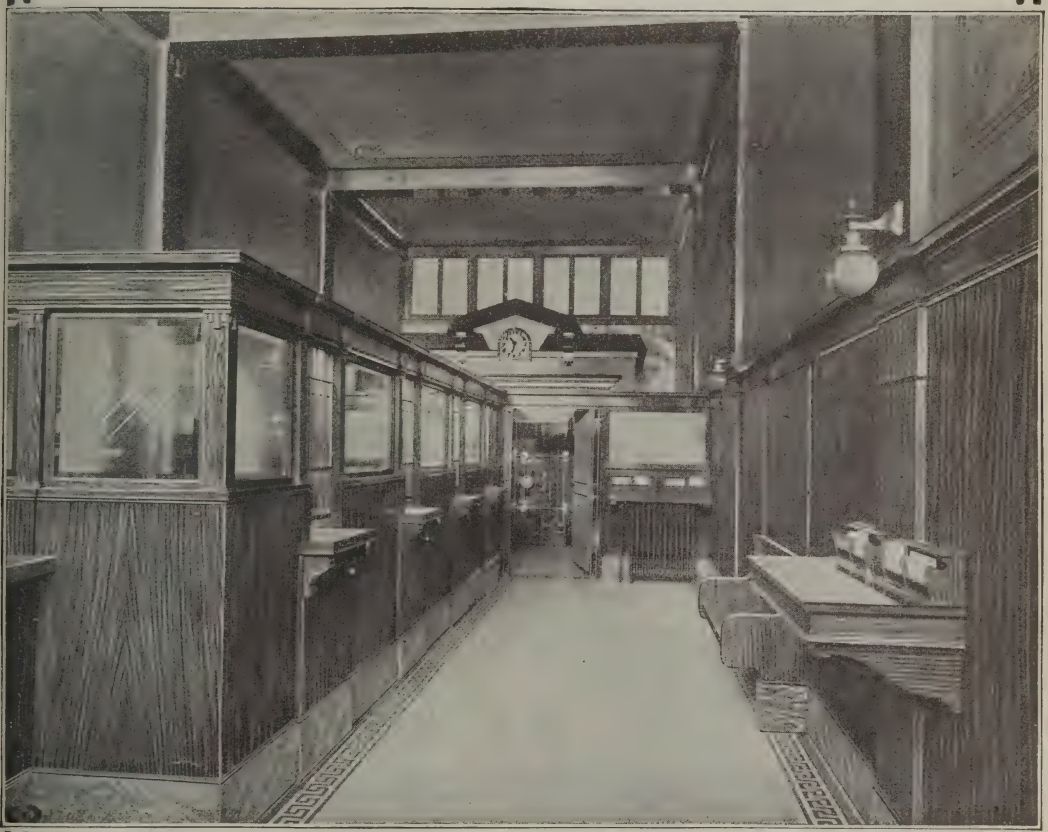
SILVER'S WOODWORKING TOOLS.

The Silver Manufacturing Company, 340 Broadway, Salem, Ohio, are sending to interested contractors, builders, etc., their complete list of carriage makers, woodworkers' and blacksmith tools. The machines manufactured by them of special interest to readers of the NATIONAL BUILDER include band saws, jointers, saw tables, cut-off saws, post drills, etc. From the appearance of these machines they are made extra heavy to stand the hardest usage which a contractor or builder is apt to give them. As it is customary to move machines from job to job or back to shop, it will be understood that a machine must be practically proof against damage or derangement at these times.

The plant of the Silver Manufacturing Company is new and modern in every particular, having recently been thoroughly remodeled and greatly enlarged. Being located on two through railroads, their shipping facilities are

RED GUM

(AMERICA'S FINEST HARDWOOD)



View of the Interior of a Western Bank—The Livingston County National Bank, Pontiac, Ill. RED GUM throughout. Designedand executed by the Bank Department of the Mosler safe Co. (E. Jackson Casse, Directing Engineer), Chicago.

This little Bank shows an interesting and intelligent use of RED GUM.

This Banking room is typical of the good taste and refined simplicity which are the keynotes of construction of small as well as large Banking Institutions throughout the United States.

The designers **wanted something different from Mahogany**—yet of equal elegance and adaptability—

So They Took RED GUM

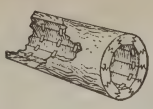
America's Finest Hardwood

Anyone planning to build apartment houses, office buildings, hotels, residences or speciolly designed furniture, should defer final arrangements and correspond at once with any of the following firms regarding samples, prices and lists of important buildings of all types wherein RED ond SAP GUM have been used with eminent practical success and signal artistic satisfaction.

LAMB-FISH LUMBER COMPANY, - - - - Charleston, Mississippi
HIMMELBERGER-HARRISON LUMBER COMPANY, - - Cape Girardeau, Missouri
CARRIER LUMBER & MANUFACTURING COMPANY, - - Sardis, Mississippi
ANDERSON-TULLY COMPANY, - - - - - Memphis, Tennessee
CHARLES F. LUEHRMANN HARDWOOD LUMBER COMPANY, - - St. Louis, Mo.
PAEPCKE-LEICHT LUMBER COMPANY, - - - - - Chicago, Ill.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

LOOK INSIDE!



SEE THOSE STAPLES.

STAY-LOCKED COLUMNS
DO STAY LOCKED

They're different—made to last and cost no more than inferior columns. Insist on having them—you'll not regret it.

Write for Catalog F—A beautiful free design book worth owning.

AMERICAN COLUMN COMPANY LTD.
BATTLE CREEK, MICH.

MR. CARPENTER AND BUILDER! WHY NOT MAKE some extra money?

by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **Rolling Ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary te send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

Write for Catalogue

Milbradt Manufacturing Company
1442 N. Eighth Street ST. LOUIS, MO.

NEW CATALOGUE ON FINE CABINET WORK READY FOR YOU

Send For One

You will like our high class materials and workmanship. We carry a large stock of kiln dried lumber in both soft and hard woods, and can get orders out promptly.

Send Us Your Lists or Plans for Estimate

Let's get together now—We know we can please you.

HARTY BROS. & HARTY COMPANY
21st Place & Loomis St. Chicago, Ill.

We manufacture everything in the line of

Consols, Colonnades Columns and Grilles

Special prices to the trade

Established 20 Years.

Chicago Grille Works
826-838 Wells St., Chicago, Ill.

Catalog Free

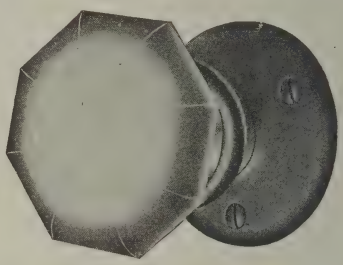
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

excellent and they are able to get in their supplies without expensive transportation charges.

It would be well for contractors and builders to have this machinery catalogue, as it may be the means of landing a job for them if they know where to quickly obtain some machine to do some special work.

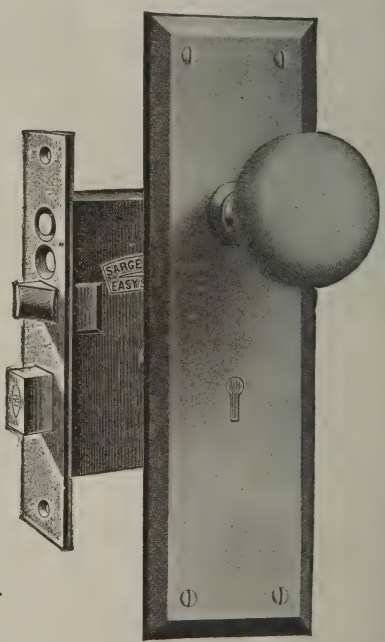
FRONT DOOR HARDWARE.

No place in the modern residence requires better hardware than the front door. It is here that the visitor gets his first impression



Glass Door Knob.

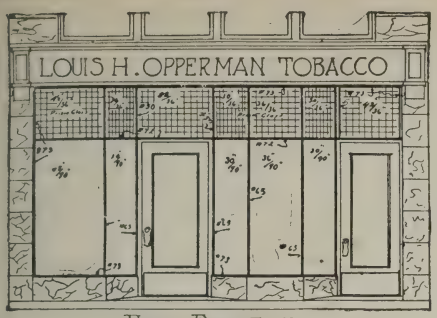
of the refinement of the owner and the first touch of the door knob indicates to him the quality of hardware throughout the entire house. For this reason it is desirable that the



Front Door Set.

front door hardware should be of the very best.

We show on this page one of the many styles of front door hardware from the latest catalogue of the Rehm Hardware Com-



FRONT ELEVATION.

If You Only Knew

how carefully **Petz Bars** are made, how uniformly perfect they come from our factory, and how completely they fill the demand for a bar at once strong, artistic and safe, you would never even consider the use of another.

We want every builder and architect to know about **Petz Bars**, so that he can specify and use them with perfect confidence. For this purpose we will gladly send samples of bars for any purpose, as well as our valuable booklet on "Modern Store Front Construction." Experts indorse and insurance men recommend **Petz Bars** because they are easy to install and will not break glass. Send for the booklet today.

DETROIT SHOW CASE CO., Sole Makers
481 FORT ST. WEST, DETROIT, MICH.

THIS BUNGALOW BOOK FREE

"Be the Bungalow Man of Your Town"

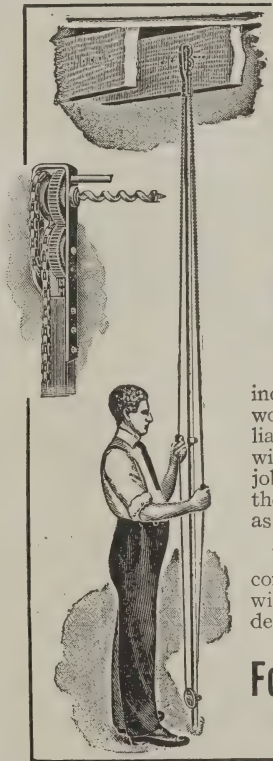
The Bungalow covered with **Red Cedar** Shingles from "crest to foundation" has come to stay. Everybody likes it. Can be stained in any color to harmonize with surroundings.

Stain costs only half as much as paint and is put on in one-half the time. You stain a bungalow once in five years while you paint clap-boards twice.

And remember **Washington Red Cedar Shingles Do Not Warp, Rot or Decay.**

Our Bungalow Book contains Photos and Floor Plans of genuine Pacific Coast Bungalows. Every contractor, carpenter and architect should get a copy. Full of up-to-date ideas and designs.

Red Cedar Shingle Mfrs. Association
Representing over 200 Mills—Daily capacity 20 millions
497 Arcade Annex **SEATTLE, WASH.**



Electrical Contractors

WILL FIND THE

Standard Boring Machine

indispensable for wiring work, and that it is reliable and durable. It will make hard woodwork jobs easy, and will perform the most delicate as well as ordinary work.

Your equipment is incomplete without it. You will be interested in our descriptive booklet.

Ford Auger Bit Co.
Holyoke, Mass., U. S. A.

OAK FLOORING

Increases the Renting and Selling Values and Attracts a Better Class of Tenants

Builders and **owners** will find it a clinching argument to say, "It's floored with OAK FLOORING." It imparts an air of **refinement** and **elegance. It is the modern flooring.**

OAK FLOORING ⅜" thickness by 1½" or 2" face can be laid **over old floors** in old homes or over cheap sub-floors in new homes **at a very low cost.** it is **cheaper than carpets** or **pine flooring.** When laid it has all the appearance of heavy flooring.

There is a **solid satisfaction** and **lasting pleasure** in the **substantial** and **dignified appearance** of OAK FLOORING.

Contractors and carpenters find it very profitable to lay ⅜" stock over old floors in old homes during dull periods. A little **canvassing** is all that is necessary to **secure** jobs.

For **durability** OAK is the **best.** OAK FLOORING laid thirty years ago, after very hard use, is still in good condition. ¶ **WRITE FOR BOOKLET.**

THE OAK FLOORING BUREAU, 897 Hammond Building, Detroit, Michigan

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Specialists and Manufacturers of

BUILT-UP VENEER PANELS

For Architectural and Interior Woodwork

Made up to your exact specification as to size, thickness, kind of wood required.

AMERICAN VENEER COMPANY

433 Market Street :: :: KENILWORTH, N. J.

CONSOLES, COLUMNS, and GRILLES

add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.

SEND FOR CATALOG No. 17

It contains many beautiful designs of Consoles, Columns and Grilles

Northwestern Grille Works

Office and Showroom, 1824 Milwaukee Ave., CHICAGO

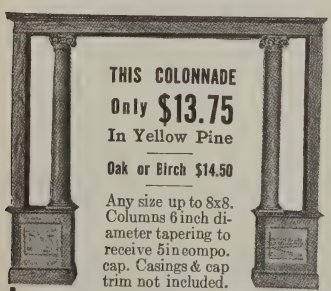
PHOENIX INSIDE SLIDING BLINDS

Comfort : Convenience : Economy

The lately patented springs and corrugated steel rods put the "Phoenix" far in lead of less improved styles.

WRITE FOR CATALOG P-T.

PHOENIX SLIDING BLIND CO., PHOENIX, N. Y.



THIS COLONNADE
Only $13.75
In Yellow Pine

Oak or Birch $14.50

Any size up to 8x8. Columns 6 inch diameter tapering to receive 5in compo. cap. Casings & cap trim not included.

THIS is positively the best Colonnade for the price in the market today. Take advantage of this special offer. Quality, satisfaction and safe delivery guaranteed. Order today. Give exact width and height of opening. State what kind of wood.

Our Catalogue No. 35 shows many new designs Write for it.

Bertelsen Adjustable Grille Co.

615-617 So. Clinton St., Chicago

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

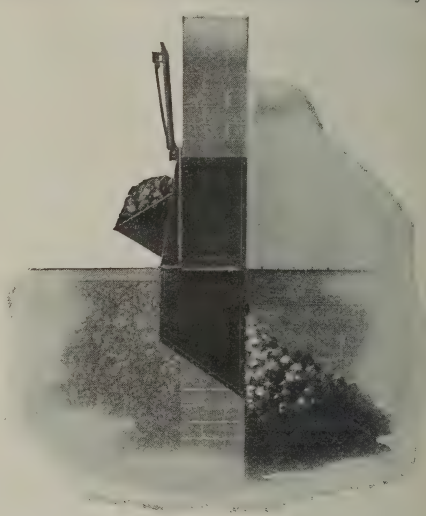
pany, 1503 Blue Island avenue, Chicago, Ill. This lock-set contains a number of features of interest to the contractor, architect and owner. As will be seen, the latch and dead bolts are both operated by one key. This makes double the security of the old style lock.

The complete catalogue of the Rehm Hardware Company shows this style of lock in a great variety of finishes, it being possible to get this set with any style of ornamental knob or where particular refinement is desired, with glass knobs.

The advantage of dealing with a large concern such as the Rehm Hardware Company insures the contractor that he will get impartial treatment and the very best service as the stock carried is so complete that there is no delay in filling an order and no reason for substituting another style for that ordered. The catalogue of the Rehm Hardware Company should be in the hands of every contractor and dealer.

MAJESTIC COAL CHUTES AND BUILDING SPECIALTIES.

The Majestic Furnace & Foundry Company, Huntington, Ind., 70-74 Erie street, manufacture a very complete line of coal chutes, joist hangers, ashpit doors, metal cellar frames, etc., for use in modern buildings, as well as their well-known line of Majestic



Majestic Store Front Chute.

warm air furnace with down draft radiators. We show on this page one of their styles of coal chutes, particularly designed to provide a neat, safe and burglarproof receptacle for depositing coal, wood or vegetables into the cellar of a store building, or, in fact, any class of construction where the grade or sidewalk line are on the same level as the floor. In many buildings this condition is found and it has been customary heretofore to provide an opening in the sidewalk which introduces an element of great danger to the passing

REHM'S REHM'S

CARPENTER MOUSE CHAIN

48 inches long, fitted at one end with patent sash cord fast, at other end with lead weight.

Price 30 Cents Postpaid

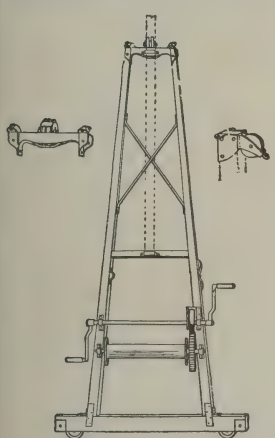
FREE

Our No. 5 Builders' Hardware Catalog and Net Price List.

We do not sell to contractors or carpenters in Cook County, Illinois.

REHM HARDWARE COMPANY
1503 Blue Island Ave.
Chicago, Ill.

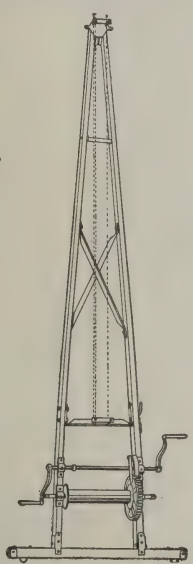
SASGEN SETTER DERRICKS



Sasgen Regular Setter
2- ton capacity—18 ft., $38.00
2½-ton " —18 ft., 40.00

These derricks are equipped with steel gears and fittings. The top sheave frame has 2 sheaves which does away with the block on top. In fact, have many improvements over old style derricks.

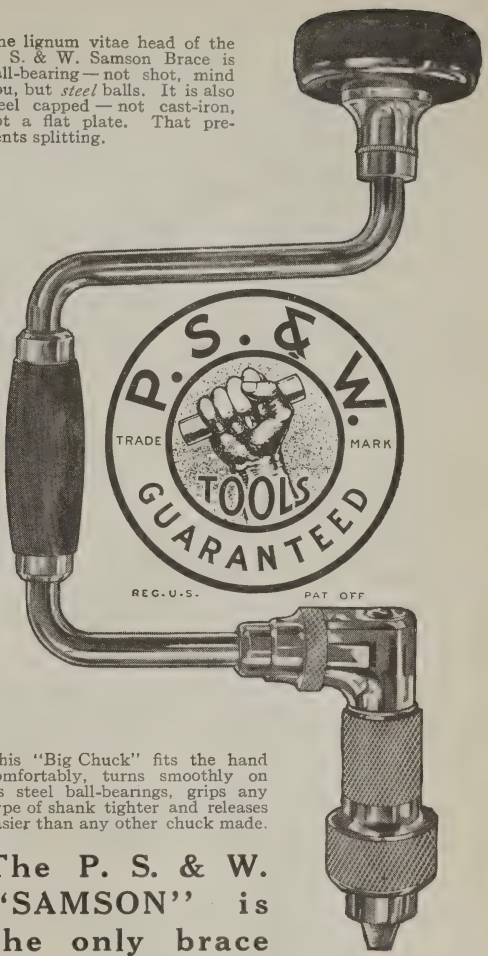
Write for Catalog N.



Sasgen T. P. Setter
Capacity 1½-ton, light and strong, price $33.00, 18 ft. length.

Sasgen Bros. 2053-57 Racine Av. **Chicago**

The lignum vitae head of the P. S. & W. Samson Brace is ball-bearing — not shot, mind you, but *steel* balls. It is also steel capped — not cast-iron, not a flat plate. That prevents splitting.



This "Big Chuck" fits the hand comfortably, turns smoothly on its steel ball-bearings, grips any type of shank tighter and releases easier than any other chuck made.

The P. S. & W. "SAMSON" is the only brace with the ball-bearing chuck.

THIS unequaled brace is only one item in the large line of guaranteed P. S. & W. Tools for Carpenters. You will find them all illustrated and described in the "Mechanics' Handy List," a 170 page book that you can have free for the asking.

It has 35 pages of valuable shop-tables and information, and lists over 200 tools for Carpenters, Machinists, Electricians and Tinsmiths. Write for it today.

The Peck, Stow & Wilcox Co.

MFRS. of the Largest Line of Mechanics' Hand-Tools offered by any maker.

Southington, Conn. New York, N. Y.
Cleveland, Ohio

Address correspondence 32 Murray St., New York City

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

STEEL CEILINGS

Are you figuring on using a medium priced Steel Ceiling? Get our catalog by all means. It shows a line of beautiful ceilings of sufficient variety to please almost any individual liking, yet at prices surprisingly low.

The possession of this catalogue and a knowledge of our line and prices will save you many a dollar if you are an occasional or frequent buyer of Steel Ceilings.

Write for It Today

INDIANAPOLIS CORRUGATING CO.
Indianapolis, Indiana

IMPROVED QUICK & EASY RISING Steam, Electric and Hand Power Safety—

ELEVATORS

and Dumb Waiters, Automatic Hatch Gates. SEND FOR CIRCULARS.

KIMBALL BROS. CO.
COUNCIL BLUFFS, IOWA

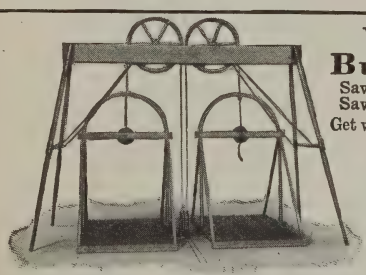
ELEVATORS

Dumb Waiters
Carriage and Store Elevators
Sidewalk Hoists, etc.

MECHANICALLY PERFECT

State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. WRITE TODAY.

Sidney Elevator Mfg. Co., Sidney, Ohio



Wise Builders

Save Dollars by Saving Minutes

Get wise to the time and labor saving features — the simplicity, durability, easy running, quick set up and knock down and other advantages of the POLYGON

MATERIAL ELEVATOR

WATERLOO CEMENT MACHINERY CORPORATION
111 Vinton St., Waterloo, Iowa

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

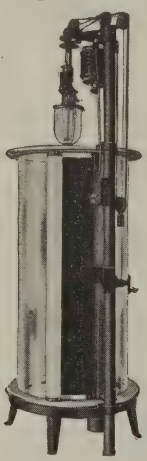
pedestrian. Many cities have ordinances either against such openings or compelling the owner to give bonds to insure the city against loss by such accidents.

The door and frame of this chute are made of heavy cast iron and provided with hinges which hold the door open, thus protecting the building when coal is being thrown in. The door is also provided with a heavy self-closing gravity latch, which can be opened from the inside only.

A more detailed description of this and the other specialties manufactured by the Majestic Furnace & Foundry Company will be found in their complete catalogue, which is sent free on request. No contractor can afford to be ignorant of the design of these coal chutes, as an owner may any day ask him about them and it is the posted contractor who secures the work.

THE SUN THAT NEVER SETS.

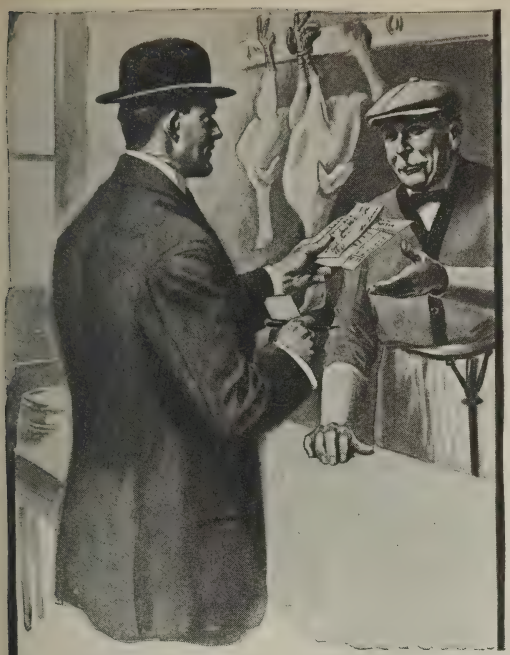
The busy contractor often wishes that the sun shone the whole twenty-four hours in order that he might carry on his work with greater facility. In many places it is possible to supplement the hours of daylight by using various forms of artificial light and so carry on his work with two or three gangs of men.



The architect is frequently up against the same proposition. While he may have daylight, it may be cloudy or dark at the time he wishes to make blue prints. This may mean a serious loss to him by having to wait until a good printing day comes along.

The Buckeye Engine Company, Salem, Ohio, have designed a machine for electric blue printing which renders obsolete the old methods of sun printing in heavy and cumbersome machines. The Buckeye plant occupies only a few square feet and can be placed in any corner of the room or building, not otherwise occupied. As will be seen by the illustrations, the machine consists of a cylindrical plate glass outside of which is wrapped a heavy curtain which holds the placing and blue print paper in place. An electric lamp, traveling down through the cylinder furnishes the required light, thus rendering daylight entirely unnecessary.

The fact that these machines are in operation in every large drafting room should lead the contractor to investigate their principles as he may be called upon to advise an owner regarding them at any time. It is the well posted contractor who is given the work of installing machines of this character and no NATIONAL BUILDER contractor can afford to be ignorant of the new methods, machines, etc., which are coming into use.



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IT is a different story with the untrained man. His wages at the best are small and uncertain. At the end of the month he often finds the pocketbook empty, with the landlord, grocer, butcher, baker, and other tradesmen clamoring for their money.

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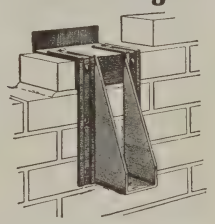

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Fireproof Metal Windows Skylights, Ventilators Sheet Metal Goods

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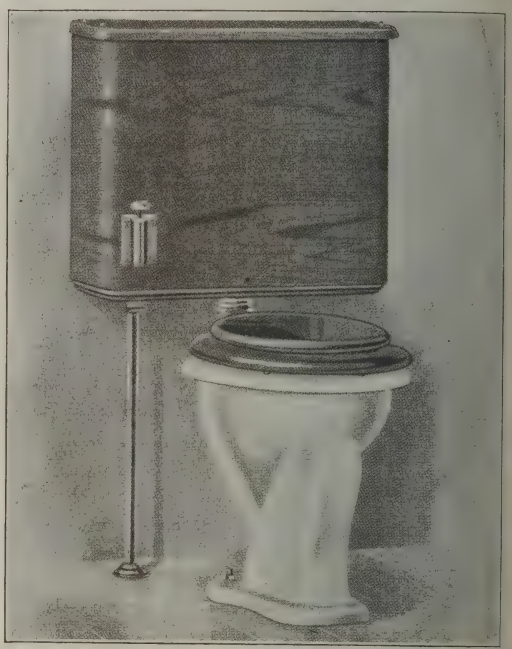

of high-grade outfits. As fast as new ideas have come out, they have taken them out and pushed them, and in this way have held the trade over a large district. The cut on this page shows one of the combinations which they are at present advising a number of their customers to install. Their latest catalogue shows why fixtures of this character possess advantages over many other styles, and contractors and builders should have this catalogue as a reference book not only for the latest designs and up to date plumbing but also as a guide for preparing their estimates.

WOODWORKER MOLDING SAWS.

The use of a woodworker is becoming such a necessary part of the busy contractor's equipment that practically every shop of any size is now using one of these labor saving machines. The fact that the machine is in a shop, however, does not always insure that it is ready for any work which may come up.

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The Huther Brothers Saw Manufacturing Company, 500 University avenue, Rochester, N. Y., have long been known as specialists in

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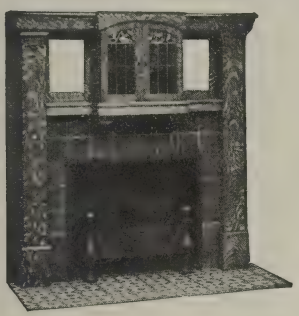

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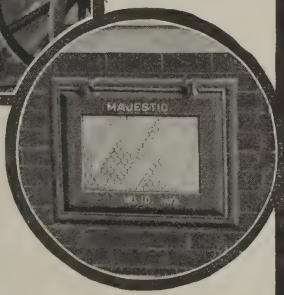
¶ Protects the building just where most needed—above the opening.
¶ The heavy steel hopper catches all the coal.



¶ When not in use, the hopper lies in the bottom of the chute body. ¶ The door locks automatically either open or closed. Strictly burglar-proof. ¶ With ¼ inch wire glass or steel panel in door.

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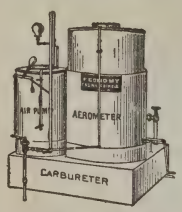

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For fastening all kinds of material to brick, stone or concrete

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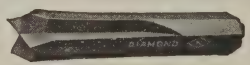

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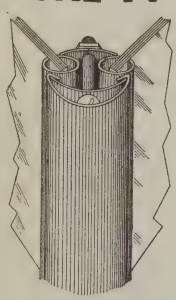
Voltz F. W. Bar No. 14
is Our Latest Product



It contains all the essential features of the STANDARD UNIVERSAL SASH BAR—but is smaller in the outside contour and is lower in price

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SCIENTIFIC PRINCIPLES of expansion compels the

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Costs no more than the cheapest. Impossible to design a bolt more easily handled. Write today for booklet "Expansion Bolt Facts" and free working sample.

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THE VAN EXPANSION BOLT COMPANY
1209 F. Fort Dearborn Bldg., Chicago, Illinois

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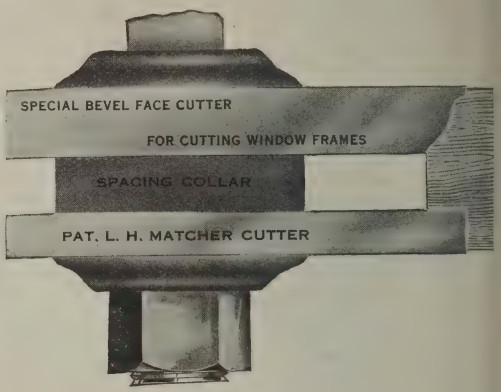
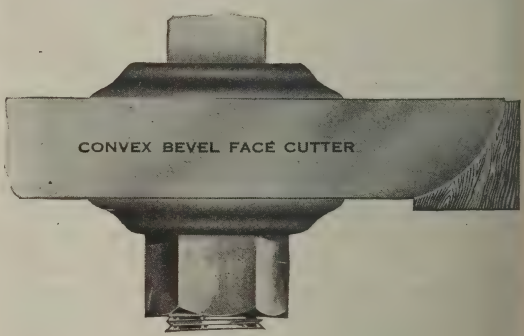
the manufacture of saws, knives, etc., for this purpose. Their latest catalogue, entitled "Woodworker's Edition No. 32," contains a large number of illustrations of saws, knives,



etc., for various kinds of work as well as illustrations showing the work which can be accomplished on them. We show on this page several cuts taken from this catalogue, show-



ing the construction of some of these saws and the work to which they are especially adapted. The complete catalogue should be in the hands of everyone owning a woodworker as it may be the means of instructing them regarding the running of some class of work which has heretofore bothered them.

ANOTHER BERGER IMPROVEMENT.

The Reliance patented chimney top recently placed upon the market by the Berger Mfg. Co., of Canton, Ohio, has aroused considerable interets among the manufacturers and dealers.

Previously designed tops were not successful for chimneys surrounded by a group of buildings due to the fact that the wind would be deflected downward by the roofs, enther the top of the chimney at the side of the chimney top and cause annoying down drafts. With the Reliance type this is impossible as the hood extends below the top of the chimney and encompasses it on three sides.

Due to careful machining the pivot movement insures positive and instant action. In fact, the hood motion is so easily affected that

The Handiest Tool In the Whole Tool-Box

That's what an old carpenter who had spent nearly all his life at his trade said when asked what he thought of the

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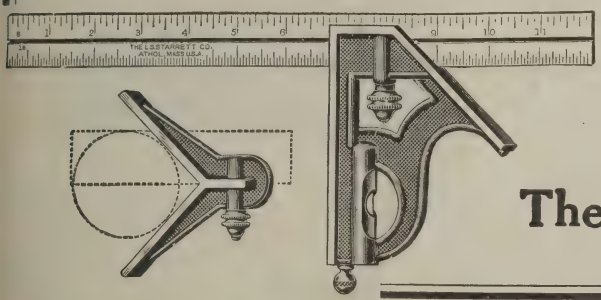
He said it because he found he could do so much with it. He had used it on all kinds of jobs and under all conditions and found that it was as he said—**the handiest tool in the box.** He could use it as a rule, or a square, or a level, a depth gage, and a bevel, and when serving as any of these it was perfectly accurate. **No wonder he was proud of it.**



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Send for Catalog No. 19M and learn what tools we make for you.

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¶ **Set it up and use it.** If you're not pleased; not sure you have big value for the price—send it back to us—we paying return charges—and we won't claim one cent from you.

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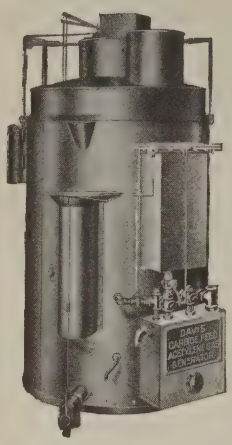
Mr. Contractor and Builder



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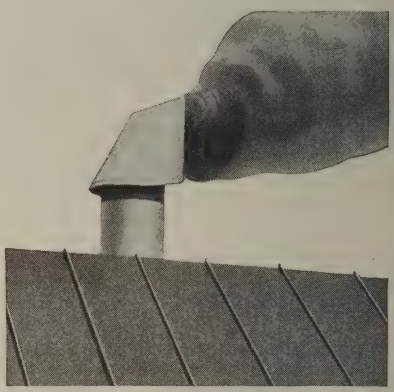
The hood design which keeps out the drafts also keeps out the rain, thereby preventing any interference with the operation through rusting of the bearing surfaces.

The structure is strong and durable, and made of the materials best adapted for the



purpose—materials which will give the utmost limit of service.

The top is used on every type and size of chimney where conditions exist as outlined above, and it is said to give the same good service whether used on home or on factory.

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The lath made by this company is manufactured by their own method, which gives it unusual strength with the minimum materials. Their catalogue is sent free to those who mention the NATIONAL BUILDER.

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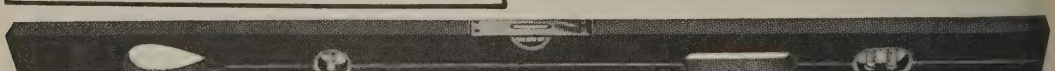

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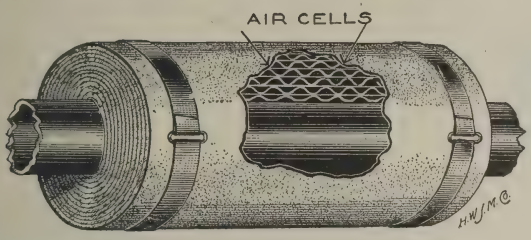

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Far less fuel than when the pipes are left bare—far less than when any other pipe covering we know of is used.

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For Hot Water and Low and Medium Pressure Steam

Actual tests and comparisons prove how deceptive ordinary coverings are—how radiation and condensation, which they are supposed to prevent, goes on in spite of them. The consequent loss of heat—which can be seen only in the coal bills—is tremendous.

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This arch principle—in addition to the materials—makes this covering far stronger than others. It's as good an insulator at the end of ten years as when first put on.

Our nearest branch will send you samples, Catalog No. 100 and full information on request.

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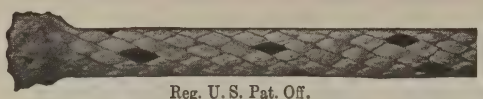

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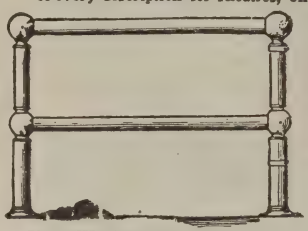

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KICK PLATES, Etc.
BRASS FRAMES
BRASS EASELS
BRASS GRILLES

For Theatre Lobbies.

LET US BID ON ALL BRASS WORK

Inducing Prices, High Class Workmanship. Send us list of requirements.

THE NEWMAN MANUFACTURING CO., | **Established 1882**
717-719 Sycamore Street, Cincinnati, O.

Do away with Sash Weights, Cord, Pulleys, etc., by using

AUTOMATIC SASH HOLDERS

Easily Installed Simple Positive Durable
Saves Money, Prevents Window Rattling
For Old as Well as New Windows
Made in 3 sizes for sash weighing 35 lbs. or more

If your hardware dealer does not have them, send us $1.00 for a trial set (enough to equip two sash or entire window) all charges prepaid, stating weight or size of sash.

AUTOMATIC SASH HOLDER MFG. CO.
48A Church Street, NEW YORK
Canadian Representative, Smith Hardware Co., Ltd., Montreal, Que.

The GALE WALL SAFE

It makes your Valuable Papers, Jewelry and Silver secure against Porch Climbers, Petty Thieves, Fire, etc

No Home or Apartment House complete without one. It has a combination lock.

Write for Descriptive Matter Today

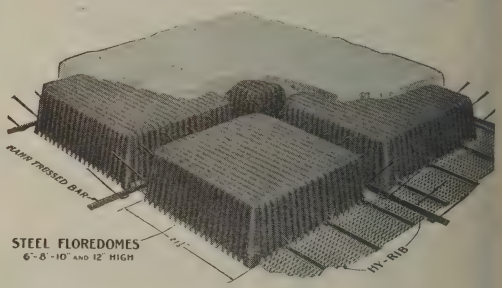
WILLIS MFG. CO., Galesburg, Ill.

FRED LIEBRICH, Agent for Cook County
1102 Monadnock B dg., CHICAGO, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

FLOREDOME CONSTRUCTION.

There are many places in residences, offices and the higher class of buildings in which fireproof construction is required and at the same time the ceiling must be left perfectly level. The ordinary style of beam and panel construction is not always suitable to such places and in consequence the Trussed Concrete Steel Company, 384 Trussed Concrete building, Detroit, Mich., have designed a unique construction by which a perfectly flat ceiling can be obtained as well as combining fireproof construction with the minimum amount of reinforcing material, thus saving in not only the



actual cost of the floor itself, but in the size of beams, posts, walls and foundations necessary to support the same.

An isometric view of Floredome Construction is shown in this article from which will be seen the principle of its use and construction. Contractors who have handled this system find that much less centering is required owing to the reduced weight and the work can proceed with greater rapidity than with other systems.

Those who wish more detailed information regarding Floredome Construction can obtain it from the Trussed Concrete Steel Company who are making Floredomes in various sizes as well as rods, lath and other materials used in fireproof construction.

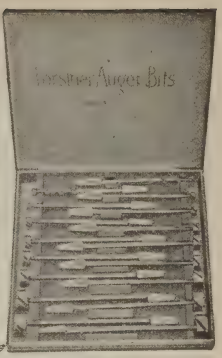
UNIVERSAL GARAGE EQUIPMENT.

The development of the automobile has made the question of garage equipment a vital one to the contractor, not only for himself, but for his clients. The contractor must be posted on the proper equipment of a garage that he may talk intelligently with the owner and he must also have the best equipment in his own garage.

The Canton Foundry & Machine Company, Canton, Ohio, have recently issued a complete catalogue "C-5" which shows in great detail their garage equipment, such as turntables, jacks, cranes, etc. These various pieces of equipment are made in a number of sizes to accommodate machines of different make, weight, wheel base, etc. The contractor anticipating the wants of his clients should be posted on this equipment and similar accessories manufactured by the Canton Foundry & Machine Company.

A BIT OF UTILITY

Guided by its circular rim—instead of its centre—the Forstner Labor-Saving Auger Bit will bore any arc of a circle, and can be guided in any direction. Doesn't matter how hard the wood is, no consequence whether it is full of knots, or the grain awkward to negotiate. The Forstner Bit works with equal smoothness under any condition and leaves a true polished surface on every job.

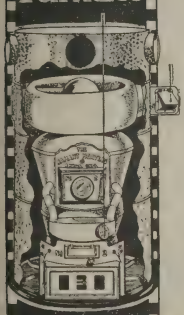


UNEQUALED FOR DELICATE WORK

Supersedes chisels, gauges, scroll-saws, or lath tools combined, for all kinds of delicate work. Cabinet and pattern makers and carpenters are enthusiastic because they do more work than other bits and cost no more. We can offer something special in the matter of price on sets packed in a sensible box. Send today for particulars and catalog.

THE PROGRESSIVE MFG. CO., Torrington, Conn.

Specify the Jahant Down Draft Furnace



Write for Terms and Free Furnace Handbook

ARCHITECTS! BUILDERS! CONTRACTORS!

DON'T RUN RISKS.

It's an established fact that nine-tenths of the time you will be condemned for using poor judgment should you specify a steam or hot water heating system.

The heating requirements of residences, flats, schools, hotels, churches, etc., vary according to climatic conditions, size of building and number of rooms, style of architecture and nature of material used in construction.

Heating efficiency can only result from a thorough analysis of the proposition as applied to each individual building.

The requirements at all times are best fulfilled by specifying the Jahant Down Draft Furnace with the built-to-order heat distributing system.

The Jahant warm air system costs less and is easier to install than other systems. It requires little space and considering it from the standpoint of the user, is easiest to care for and delivers plenty of heat whenever and wherever desired at a saving of ⅓ to ½ in fuel bills.

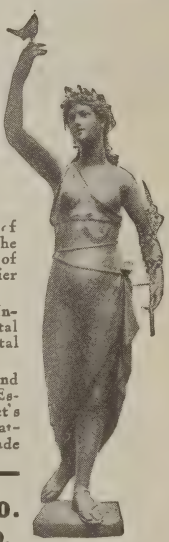
We guarantee the Jahant, make prompt deliveries and prepay all freight.

Our free illustrated book gives general specifications, descriptions and prices. It explains our co-operative policy of furnishing without cost to you, special blue prints and specifications to be submitted with your building plans and tells why it will pay you to specify the Jahant.

The Jahant Heating Co.
90 Mill Street, AKRON, O.
Furnace Builders for more than 30 years.

Sheet Metal Statuary of Rare Artistic Worth

WITHIN the last quarter of a century there have been reproduced at the Mullins factory, Salem, Ohio, statues of Sheet Bronze and Copper that are nothing short of marvelous. Many of them were made from the models of famous sculptors, to their entire satisfaction.

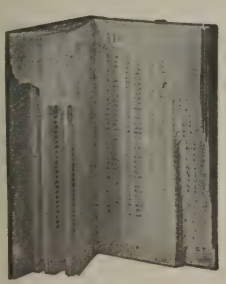


We are prepared to reproduce, in minute detail, the most delicate lines of any model. It is this faithful portrayal which helps to account for the world-wide fame of Mullins Sheet Metal Statuary. Diana on the top of Madison Square Garden, the group on the New York Life Building, the Statue of Progress, Chicago, are among our earlier achievements.

We also make Fireproof Metal Windows, Skylights, Cornices, Finials, Metal Tile Roofing and Sheet Metal Ornamental Work of every description.

Tell us what you're interested in and we'll send the proper catalogs at once. Estimates promptly submitted on architect's drawings. Attractive prices. Quick, satisfactory service. Discounts to the trade on application.

The W. H. Mullins Co.
210 Franklin St., SALEM, O.



Mighty Cheap Insurance

$1.00 is mighty cheap insurance against the losses due to faulty lumber estimating. No man can possibly carry in his head the number of feet in any number of pieces of all the different sizes of lumber. Errors are bound to happen more or less frequently, and one such error means a loss of many times the cost of **The Perry Lumber Reckoner.**

The Reckoner is a carefully prepared pocket edition of tables of lumber showing the number of feet in any number of pieces in a given size, fully indexed so that you can turn instantly to the right page. When you buy this book you do so with the understanding that we'll cheerfully refund your money if the book is not entirely satisfactory. Don't delay. Send us your name, address and $1.00 and get the book prepaid.

BENJ. L. JENKS, Pub., 906 Williamson Bldg., Cleveland, O.

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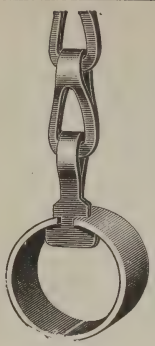


"SYMPLIST"

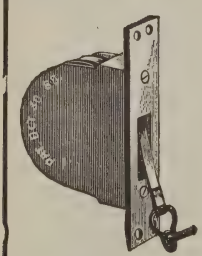
Steel Sash Fixtures are easily put in place. No possibility of getting loose or out of order. Folder 57-B on request.

NIAGARA FALLS METAL STAMPING WORKS
Manufacturers of Hardware Specialties
NIAGARA FALLS, N. Y., U. S. A.
92 M

The Han-Cot
CARPENTER
SASH MOUSE

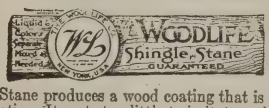
Has fastener, weight and chain 59 inches long.
Beats the old nail and string way.
Price 30 Cents Prepaid, or ask your dealer
HANDLEY & COTTERMAN, 164 N Wabash Ave., CHICAGO

Caldwell Sash Balance



Does away with weights and cords and vastly more durable. Makes sashes work perfectly. Permits greater window space in new work, as box frames are not necessary. May be applied to old windows without altering sashes or frames.

Write for Circular to the
Caldwell Mfg. Company
2 Jones Street Rochester, N.Y.

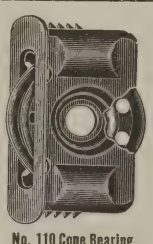


WOODLIFE
Liquid and Colors
to be mixed as needed to make Woodlife. Shingle Stane produces a wood coating that is both preservative and decorative. It costs too little to imitate and is better than any substitute. Easily applied. Color cards and prices on request.
The Woodlife Co., 188 Montague St., Brooklyn, N. Y.

HAVE YOU POWER BORING MACHINES?

Quadruple Bit. Price, $5.00
Can not be used in a hand brace.

If so, no Sash Pulley can be classed with the
CONE BEARING
No. 110
Mortised at one punch with the Quadruple Bit or bore four holes with a single bit and it's done.



No. 110 Cone Bearing

No cutting, fitting nor trimming. Saves time and money. Write for free samples.
Grand Rapids Hardware Co.
118 Pearl Street, Grand Rapids, Mich.

THE LIFE OF THE SAW.

No matter how carefully made the saw may be or how good the materials used in its construction, constant use will render filing necessary. At such times it is well to consider the subject of files. It is readily to be believed that there is as great discrepancy in the manufacture of files as in any other tools or equipment. The same range of materials is possible and there is equal opportunity for carelessness in the manufacture. A poor file will frequently do more harm than good and every carpenter should know how to recognize a first quality file.

The Simmons Hardware Company, St. Louis, Mo., have made a long and careful study of the subject of files and in placing on the market their keen kutter slim taper files believe they are advocating the sale of the most perfect and durable files made. Not only do these files outlast the ordinary kinds, but their efficiency is far greater for all exacting work. The care used in cutting the teeth of keen kutter slim taper files insures that every tooth is exactly the same depth and shape. This in turn assures a smooth, even cutting file with a perfect freedom from the rasping, grinding, chewing effect of the ordinary varieties.

The Simmons Hardware Company believe that these files are on sale in practically all high-grade hardware stores, but suggest that if the carpenter is unable to secure them that they can be obtained direct.

GALVANIZED NAILS.

Every architect, contractor and builder has viewed with alarm the approach of the house owner who has just discovered the fact that the carpenters are not nailing the roof boards close together, but are leaving almost two inches between them. When it is diplomatically explained to them that this is for the protection of the roof to allow the shingles to properly dry out it can readily be understood that the moisture comes in close contact with the shingle nails. The natural result is that the nails rust out and it is generaly understood that the life of a good shingle roof depends upon the life, not of the shingle, but of the nails which holds them.

There have been many expedients resorted to with the idea of lengthening the life of the shingle nail. Some carpenters use brass, copper or composition nails, which cost far more than the common nails. Some claim that the old-fashioned cut nail will outlast the modern wire nail.

Wilcox, Crittenden & Co., Middletown, Conn., found that the surest protection against rust was by the use of galvanized nails. Their process of manufacture adds very little to the cost, but prolongs the life of the nail indefinitely. The special processes which they use in the manufacture of their Neverrust cut nails insures that the nail is thoroughly coated with the zinc and that no moisture can injure

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Stays waterproof

Trinidad Lake asphalt makes roofing *stay* waterproof. It is the product of Nature. And man has never equaled it for roofing. We use it to make

Genasco

THE TRINIDAD-LAKE-ASPHALT

Ready Roofing

Mineral or smooth surface. Comes in rolls ready and easy for anybody to lay.
Ask your dealer for Genasco. Write us for samples and the valuable Good Roof Guide Book—free.
The **Kant-leak Kleet** for smooth-surface roofings does away with nail-leaks and makes same watertight without cement. Ask for it packed in the roll.

GENASCO — THE STANDARD OF EXCELLENCE — TRADE MARK

THE BARBER ASPHALT PAVING COMPANY

Largest producers of asphalt, and largest manufacturers of ready roofing in the world

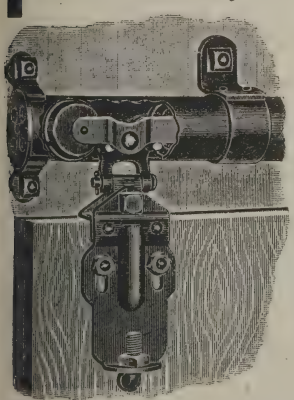
PHILADELPHIA

New York San Francisco Chicago

THE STAR LINE GOODS

Door Hangers

That are Noiseless, Light-Running and Adjustable



Adjusted in an instant with an ordinary wrench, so that doors can be set nearer or farther from building, lowered or raised as desired.

No. 440 Cannon Ball Barn Door Hangers

are steady, light-running and noiseless. They never fail to make good. They are one of our famous "Cannon Ball Battery" door hangers which have silenced competition.

Write for Catalog and Exclusive Agency Plan.

HUNT, HELM, FERRIS & COMPANY

6588 Hunt Street, HARVARD, ILL.

BETTER MILLWORK

Plans by Geo. F. Barber & Co.
Knoxville, Tenn.

Mr. Contractor, Are You Satisfied

that you are getting the best quality and service in Millwork and lumber that your money will buy? If not, let us prove to you that our **"BETTER MILLWORK"** and lumber is right in quality and manufacture, and that it will make you a **15 to 25% saving on every job.**

Write us now—we figure Millwork from plans

Chicago Riverdale Lumber Co.

13537 Indiana Avenue

RIVERDALE, CHICAGO

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LUFKIN

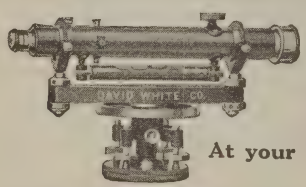
Steel Measuring Tapes

With Instantaneous Readings can be used at all times and under all conditions with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catalogue No. 12.

THE LUFKIN RULE CO.

SAGINAW, MICHIGAN, U. S. A.

NEW YORK - - - - WINDSOR



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and know your work is accurate. Satisfaction guaranteed or money back. Don't delay—Write for Catalogue and Special Prices.

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REMEMBER—Tomorrow's Success Depends Upon Today's Preparation

Prepare yourself and secure a

BECKMANN INSTRUMENT

The first element of success is accuracy.

Our instruments are all guaranteed accurate.

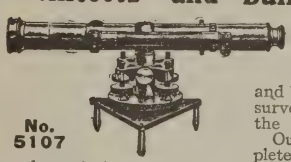
Send for CIRCULAR W

THE L. BECKMANN CO.

100 Adams St. TOLEDO, OHIO

Established 1874

Architects' and Builders' Levels



No. 5107

We manufacture every requiste of the engineer for field and office work and build a special type of surveying instruments for the architect and builder. Our catalogue lists a complete stock of drawing, mathematical and surveying instruments and measuring tapes.

Send for Copy

KEUFFEL & ESSER CO.

NEW YORK
127 Fulton Street

General Offices and Factories
HOBOKEN, N. J.

Chicago St. Louis San Francisco Montreal, Can.

it in any way. As nails of their manufacture are widely used in marine work, where they are subjected not only to moisture, but to the chemical action of salt water, it will be understood how efficient this process of manufacture is.

There is so little secrecy about the Wilcox-Crittenden process that they are willing to send detailed information regarding it to contractors, builders, dealers, etc., and ask the widest investigation of their claims. A booklet describing their processes in full will be sent on request.

INTERIOR METAL WORK.

Twenty years of experience in the manufacture of all sorts of sheet metal products has had an educating effect upon the Indianapolis Corrugating Company. This long experience has shown them defects in methods of manufacture and materials and in the methods of putting up the work.

During this long time which they have spent in perfecting every device for the manufacture of sheet metal building materials they feel that they are fitted to select designs which will meet the views of the greatest number of people to produce an accurate ceiling plate and at a minimum cost.

In consequence their recent catalogue B contains a large number of designs worthy of selection for a complete catalogue of this character and the clear-cut decorations indicate the skill used in preparing the dies and in the entire process of manufacture.

This catalogue contains explicit directions regarding the measuring of the rooms in which the plates are to be used as well as for ordering, installing and finishing the work. We note that with each ceiling which they furnish they prepare a working plan drawn to scale showing how the furring strips are to be applied and the exact position of each component part of the ceiling. The specification which accompanies this plan lists the number of each different piece and gives its location so that it is easy to check up the order and to avoid delay due to finding the order one or two pieces short at the finish.

The steel used by the Indianapolis Corrugating Company is specially prepared for their purpose, it being extra soft to allow deep, clear stamping and also particularly tough to keep it from breaking under the hammer.

As the finish of the plates is no small matter of concern to the owner, the Indianapolis Corrugating Company take great pains to paint the plates after being stamped and trimmed, thus leaving no spots unpainted which might start rusting.

The complete catalogue B of the Indianapolis Corrugating Company should be in the hands of every contractor, as it is of value in securing work from owners desiring to line their stores, theaters, churches, banks and even residences with this material.

NAT BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

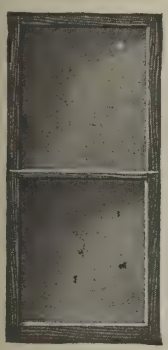
FREE ANDREWS MINNEAPOLIS HEATING CO.

Architect's Scale SEND US TWO OR MORE NAMES of persons who are interested in or want to buy Hot Water Heating Plants and we will send you this scale. Back inches are divided into 6, 10, 12, 16, 20 and 40 parts. Also free catalog on request. Name this paper when writing.

ANDREWS HEATING CO., 1287 HEATING BUILDING MINNEAPOLIS, MINN.

Investigate Before You Buy

and you will find we can save you lots of money on anything in the line of HIGH-GRADE sash, doors, frames, blinds, mouldings, inside trim, grilles, colonnades, stair and porch work, mantels, grates, tiling, art glass, paints, roofing and building papers, wall boards, hardware, hardwood and parquetry flooring, rolling partitions, screens, steel ceilings, gutters, shingles, etc.



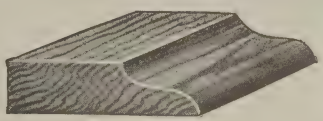
WINDOWS
42c and up

Our new catalog mailed free will convince.

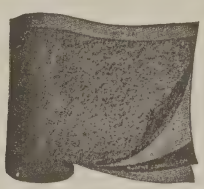
Prompt shipments and materials all first-class.

Let us send you our SPECIAL FIREPLACE CATALOG—showing unusual values.

The Huber Builders Material Co.
39-43 Vine Street CINCINNATI, OHIO



WINDOW BEAD
Best Yellow Pine
27c per 100 lineal feet



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$1.50 and up

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$3.58 and up

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KOLL'S PATENT **Lock Joint Columns**

Hot Off the Press

Our trade bulletin No. 1 containing valuable information for the Architect, Woodworker and Builder. All the information you need regarding wood columns. This is free for the asking.

THEY CANNOT COME APART

HARTMANN-SANDERS COMPANY

Main Office and Factory, 2155 ELSTON AVENUE, CHICAGO
Eastern Office, 1123 BROADWAY, NEW YORK CITY

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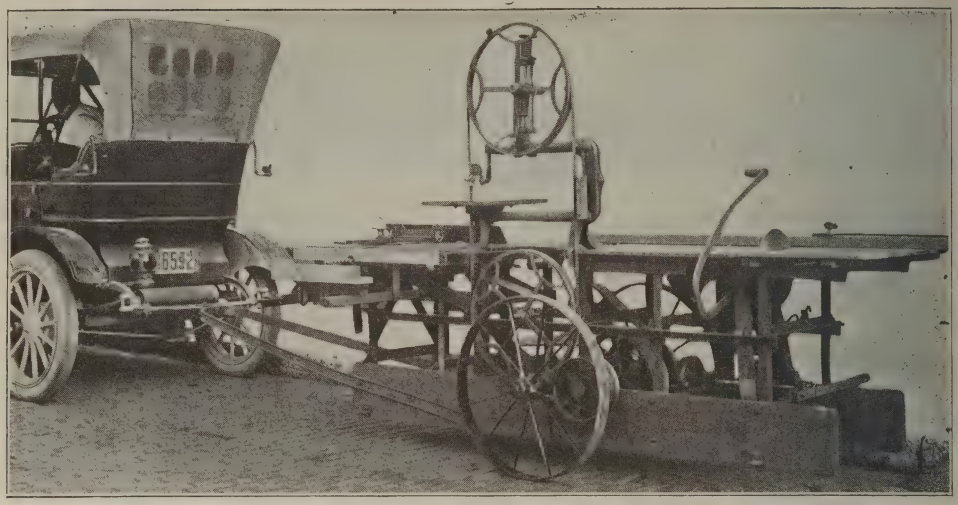


UTILIZING THE AUTOMOBILE.

The progressive contractor has recently made two important discoveries; one that the portable woodworker is a necessary part of his equipment, and second that it is difficult to get along without an automobile.

The Parks Ball Bearing Machine Co., Knowlton and Fergus streets, Cincinnati, Ohio, have arranged their portable woodworker so that the automobile is available for use with it. The cut herewith shows the woodworker being transported from job to job by the automobile.

Mr. Parks has also arranged the woodworker so that it can be run by the engine of the automobile.

A simple truck is designed which raises the rear wheels a few inches off the ground. Belts then connect the rear wheels to a countershaft which in turn drives the woodworker. The same difference in speeds at which the engine can be run is thus transferred to the woodworker, so that the proper speed can be maintained for any desired class of work.

The question of maintaining a uniform speed when using a car for this purpose led Mr. Parks to design a governor which could be set for any definite speed.

We understand that while this method is original with Mr. Parks, that he will be glad to explain the construction of the entire apparatus, including governor, brakes, etc., to any who wish to use their car in a similar manner.

BETTER BUILDINGS.

The modern manufacturer of first class materials is not satisfied to forget his sales as soon as he ships the goods. On the contrary, he is anxious to follow them until they are installed in place and even longer.

He is also interested in giving to the prospective owner every possible facility for securing the best material and many companies operate departments for this purpose alone.

The American Sheet & Tin Plate Company, with general offices in the Frick building, Pittsburgh, Pa., manufacture a great variety of material which enter into the construction of barns, warehouses, factories, bungalows, garages, residences, etc. Knowing that many builders are not fully posted on the best way to use these materials, they have prepared a neat booklet entitled "Better Buildings," showing in great detail plans and drawings for practically all classes of buildings which will be found on the modern farm as well as showing how their products can be and are used on modern residences, bungalows, cottages, etc.

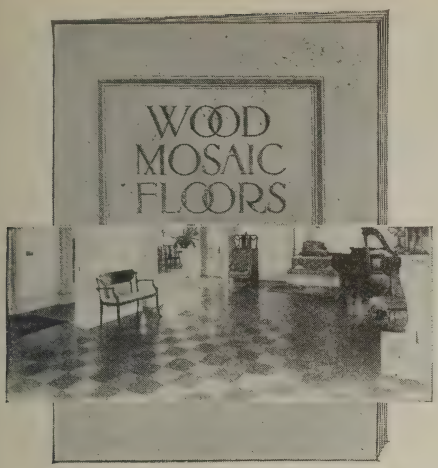
This book contains a great deal of useful information for builders and property owners and we understand that the American Sheet & Tin Plate Company will send it free to NATIONAL BUILDER readers.

LEADER STEEL FURNACES.

The practice of selling furnaces direct to the consumer has been followed by the Hess Warming & Ventilating Company, 907 Tacoma building, Chicago, Ill., for many years. There are advantages in this custom both to the manufacturers and to the consumer. It means better service, as the purchaser has a larger stock to select from and is sure of having the proper furnace shipped promptly. It means lower prices to the consumer, as the dealer or middleman's profit is cut out.

The Hess Warming & Ventilating Company have interesting propositions to the prospective buyer by which the furnace can be set up and operated before the payment of a single cent.

The large book of furnace heating which the Hess Warming & Ventilating Company is sending out contains a lot of useful information on heating, as well as being a complete guide to the selection to the proper judgment. This is sent free on request.



Are you in the habit of stepping over a hundred dollar note rather than to stoop and pick it up? The comparison between just such action and the reasons why you should open relations with us is not overdrawn.

Never, in all the history of the country, has the demand for Parquetry flooring been greater. Besides, never has there been a more psychological time for intensifying that demand. We make these two statements with the utmost sincerity—not in the sense of an argument.

For many years we have had our heart set on a piece of business literature that would in as few pages as possible concisely delineate the virtues of hardwood floors and especially the Wood-Mosaic Products. We have never experienced any difficulty in maintaining our supremacy in the more difficult and pretentious field. Wood-Mosaic quality and service has sort of become a recognized standard. The elaborate, complicated, more expensive and installations where there was the need of creating designs or the true interpretation of stipulated ideas naturally worked themselves to our factories and agencies. Meanwhile, we have of course produced thousands of the smaller and more medium priced jobs—which does not signify, however, products of a lesser quality.

In the run of every-day contracts we have found that price has been a very important consideration. Virtually everybody admits the desirability of hardwood floors and in the same breath they raise a great big *But—Price.* Explanation of the desirable features and the fact impressed that the cost is in comparison with the price of a carpet, parquet floors are almost invariably selected.

We have just issued the booklet which we have so long had in mind. It tells the whole story so simply and impressively that we want to send you a copy with our compliments. The appeal is directed at the consumer but the information is for your consideration also.

Then, we want to open negotiations with you regarding livening things up around your town. We might say here that not everyone can represent us. We are looking for only men of the right calibre. If you are willing to spend a few postage stamps investigating, we would be glad to hear from you. If not that progressive to meet us half way, we can't do business anyway. "Order takers" have cobwebs in their windows. The public and their purse follow the "Pied Piper."

WOOD-MOSAIC COMPANY

33 Hebard Street **Rochester, New York**

Saw Mill and Flooring Factory
New Albany, Indiana

WOOD-MOSAIC FLOORING
TRADE MARK REGISTERED

Sales Office and Parquetry Factory
Rochester, New York

Artist's drawing of the residence of W. F. Harrah, Niles, Michigan. Roofed with Asbestos "Century" Shingles by H. A. Newman, Chicago, Architect, and Grand Rapids Sheet Metal and Roofing Company, Grand Rapids, Michigan, Roofing Contractors.

Asbestos "Century" Shingles

"The Roof that Outlives the Building"

PEOPLE are showing a lot of interest in these *Veneered Red* Asbestos "Century" Shingles.

On all buildings where cost is a special object, you can now supply *a red roof at practically the same price as a gray one.*

Indian Red face backed up with gray. Made of the "Century" asbestos-cement composition, by the famous "Century" process, strong, fireproof, permanent—never need painting or repairs.

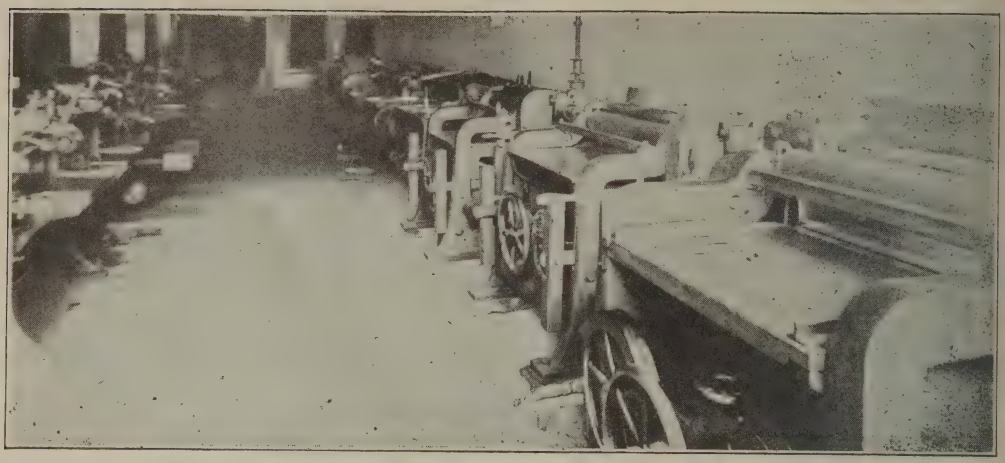
Get the facts. Drop a line to our nearest Branch Office. Write us for Booklet "K. & M., 1912."

Keasbey & Mattison Co.
Factors
Ambler, Pennsylvania

Branch Offices in Principal Cities of the United States

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT. BUILDER



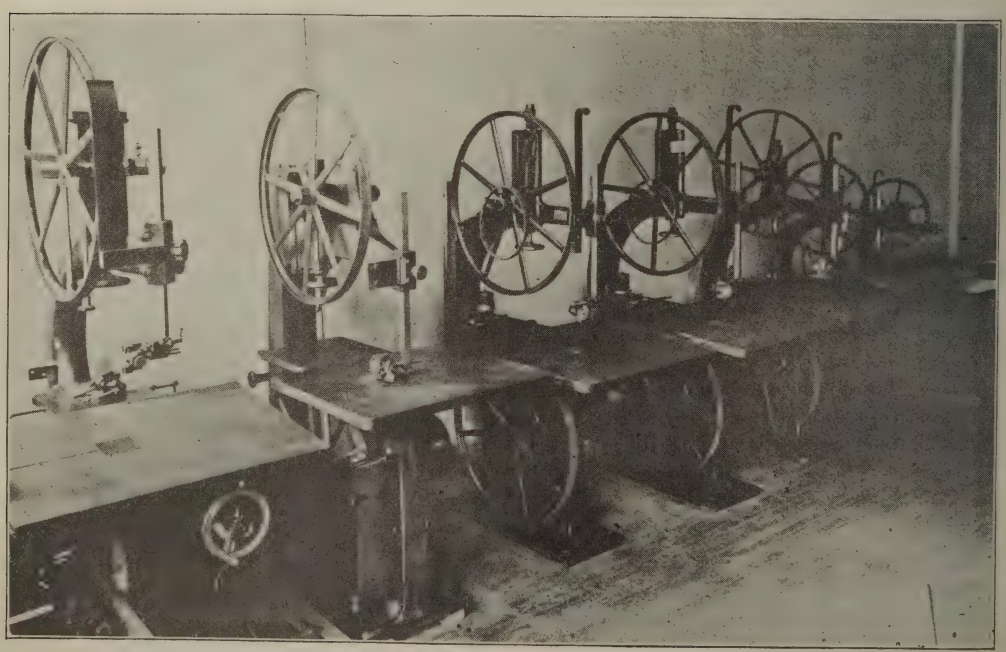
Two Rows of Planers Ready to Run.

WOODWORKING MACHINERY.

The showrooms of the Chicago Woodworking Machinery Company, 162-166 North Clinton street, Chicago, Ill., contain a great variety of new and second-hand machines of interest to the woodworker, whether he be contractor, builder or engaged in the manufacture of doors, trim, etc.

We show on this page a view showing part of the large stock of planers now on the floor and another showing some of the band saws, which they have ready to ship out the moment an order is received.

This company has a well-equipped shop for rebuilding machines which have become more or less inaccurate through wear or misuse. When they leave this shop every machine is fully equal to new and can be sold at a much lower price. Those interested in machinery of this character should get the complete list of the Chicago Woodworking Machinery Company and see some of their bargains in machinery, supplies, etc.



Band Saws Ready for Shipment.

BUFFALO WIRE WORKS CO.

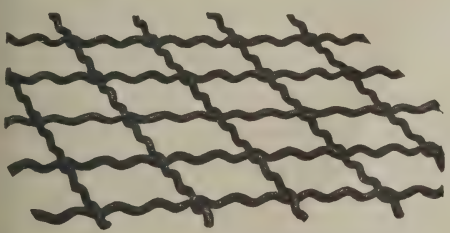
FORMERLY

Scheeler's Sons

Manufacturers of

WIRE CLOTH

Crimped Wire Concrete Reinforcement, Plain and Galvanized, in all size meshes and Gauges of Wire.



WIRE WORK

Plain and Galvanized Wire Lathing, also Grimm's Galvanized Corrugated Wire Lathing.

Buffalo Wire Fencing.

ARTISTIC METAL WORK

AGENTS FOR

Clinton Electric Welded Fabric

Samples and Prices Upon Application

SEND FOR OUR No. 5 CATALOG.

442 TERRACE

BUFFALO, N. Y.

Build Your Own Way Up!

EVERY boardyou saw, every timber you frame, every nail you drive, is building **another man's success!** Why not build **your own** way up? Get the knowlege that will promote you higher and higher in your trade—that will make you the contractor—the owner—instead of an ordinary workman. All you need is ambition and training.

Our home study courses gives you this knowledge in a short time.

Chicago Technical College

Our Short, Complete Home Study Courses

In Architecture and Building Construction, Architectural Drafting, House Planning, Estimating, General Contracting, etc.

Thorough courses. Students study plans of buildings actually being constructed. Your work approved by leading Chicago contractors and architects. **Complete outfits free to students.**

Whatever work you are interested in, mark with a cross (X) in the coupon and mail today!

Low tuition. **Study at home in leisure hours.** Remember, the home study work is the same as in our college day and evening classes. We give both resident and correspondence courses. State which you want.

Chicago Technical College

655 Athenaeum Building, Chicago, Illinois

Lay the foundation NOW by mailing this coupon

Chicago Technical College, 655 Athenaeum Bldg., Chicago, Ill.

Gentlemen: I have marked with a cross (X) the branch or branches I am interested in. Please tell me how I can qualify for a well-paying position.

☐ Architectural Drafting	☐ General Contracting
☐ Builders' Course	☐ Structural Drafting
☐ Estimating	☐ Structural Design
☐ Plan Reading	☐ Mechanical Drawing
☐ House Planning	☐ Machine Drafting
☐ Building Superintendence	☐ Machine Design

Name_____ Address_____

Town_____ State_____

Resident or Home Study Course_____

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

SILVER STEEL SAWS.

The makers of Silver Steel Saws, Messrs. E. C. Atkins & Co., Indianapolis, Ind., are placing a most interesting proposition before the dealers in their saws. This consists of making up their saws in Gift Boxes to be given as Christmas presents to carpenters and is a most excellent way of calling attention to the fact that good tools make the most valuable presents, as one is reminded of the Christmas spirit every time he uses one of these gifts.

The long experience of the Atkins Co. in saw manufacturing, as well as their reputation for saws of the highest quality, makes a gift of one of their saws a most pleasing present to the up-to-date carpenter. The many styles of saws which they make assure one that the proper saw can be selected and the quality is always assured.

Incidentally, the Atkins Co. make some of the largest circular saws in the world, and their plant is equipped with every modern device for producing perfect work.

It is probable that the many dealers who handle the Atkins Saws will have these gift boxes and saws in stock in time for the holidays, but if not, the reader is asked to send to the Atkins Company for their new circulars describing these boxes in detail and the saws, which can be used in them.

The Atkins Gift Boxes containing Atkins Saws are of interest as showing the various styles, sizes, etc., in which their goods are made, and their special propositions to National Builder readers is well worth the cost of writing to them.

AN OPPORTUNITY.

Individual education has heretofore been an opportunity which could only be taken advantage of by the wealthier classes. In the engineering profession the high standing necessary to instruct others has made this method very expensive.

During the last few years, however, there has been designed a course of study by one of the best engineers and educators by which the individual is given individual instruction. This course, originated by Mr. N. B. Dobe, Chief Draftsman of the Engineers Equipment Co., Dept. 1678, Chicago, has in mind the education of the mechanic, draftsman, carpenter or contractor who wishes to add to his practical knowledge the technical education necessary to fit him for the highest grade of work in his line.

Engineering is an exact science and combines a great deal of technical and theoretical knowledge, which the ordinary draftsman would not acquire in a lifetime in an ordinary office.

Specialization in various fields cuts out of the small office a large amount of the information which is common in other offices. It is true a draftsman could drift from one office to another and thus take up a great deal of information, but under those circumstances he would be at a great disadvantage, having to learn the technique of each separate office while working at comparatively low wages. In the end, he would have, it is true, a broad education, fitting him for practically any work which would come up, but it would be at an expense of years of hard work at comparatively low wages.

The broad experience as a draftsman of Mr. Dobe fits him particularly for training draftsmen and others along special lines and fits him to give individual instruction to each student, and the instructions which he gives, provided they are ambitious, with push and energy enough to appreciate his efforts, enables them to take charge of and design practically any work in the engineering field.

Of course, it is understood that all of this work on the part of the student is done at his own home, where he has every facility for pursuing his studies uninterrupted and where he can devote just such time as he has at his disposal.

The progress, therefore, of each individual depends upon his own efforts and circumstances, the instructions by Mr. Dobe being sufficient to advance him just as rapidly as he can individually progress.

The prospectus of the fall courses of engineering which Mr. Dobe is sending out is sent free to those who are anxious to advance themselves in the engineering and drafting professions

It may be of interest to know that Mr. Dobe also includes in his course of instruction a complete set of drawing instruments and other equipment necessary to carry on the course of study so that the student has to pay for only his tuition. The cost of the entire course, therefore, is known at the beginning.

Amatite ROOFING

Mineral Surfaced—
Needs No Painting

EVERYTHING about Amatite appeals to the man with common sense. He can see its superiority at once—the real mineral surface ***which never needs painting;*** the two layers of Pitch which is the greatest water-proofing material known; the two layers of heavy Tarred Felt—all these contribute to the popularity of Amatite.

We can make Amatite better and cheaper than anyone else on account of our greater facilities, and consequently we sell it at a surprisingly low figure.

Simply the fact that it needs no painting is enough to make a man sit up and take notice—especially the man who has spent time and money in painting and repainting smooth surfaced roofings.

Write today for further information.

Barrett Manufacturing Company

New York Chicago Philadelphia Boston
St. Louis Cleveland Pittsburgh Cincinnati
Kansas City Minneapolis Seattle
Corey, Ala.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

Run this adv. in Carpenters & Builders' papers just as it stands — it appeals to the general public better than

Note below

WHO SAID ALL THIS ABOUT CYPRESS?

"THE WOOD ETERNAL"

"THE WOOD ETERNAL"

(Here's a part of the good things they said:)

"CYPRESS is put to almost every use as an interior trim for houses.....natural color or stained.....contains little resin.....thus affords a GOOD SURFACE FOR PAINT, WHICH IT HOLDS WELL..... popular.....for kitchens, where it is subjected to dampness and heat..... *shrinks, swells or warps but little*.....For the parts of houses exposed to the weather it serves equally well. AS SIDING IT PRACTICALLY WEARS OUT BEFORE IT DECAYS.....made into porch columns it retains its shape, *holds paint,* and has sufficient strength.....It is placed as cornice, gutters, blinds.....and railing, and *is much used for Porch Floors and steps*..... Much CYPRESS lumber is employed in the construction of *SILOS*..... The FARMER puts the wood to many uses.....ITS LASTING PROPERTIES FIT IT WELL for curbs..... *Resistance to decay* fits it for stable floors and timbers near the ground, as well as for.....gates, and especially for fence posts... .one of the best available woods for picket fences, because it *shows*

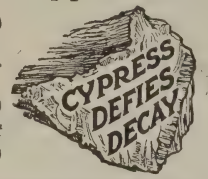
and practically all else.....the builder needs.....Agricultural implement manufacturers make seed boxes of it, wagon makers.....for beds.....carriage builders and automobile makers work it into panels for fine bodies..... *Its slight tendency to warp* has caused its employment for incubators.....freight-car siding.....many builders of *gasoline launches* are said to be using Cypress *exclusively* for hull planking.....makes handsome church pews.....Telephone boxes and switchboards of *CYPRESS* are coming into use.....spools.....beehives;.....seine floats;.....tables.. ..curtain poles; .....patterns;.....shelving and counter tops;.....shims;.....tool boxes. CYPRESS has been substituted for white oak for wine barrels....The same....freedom from taste is claimed for it by pump makers, who recommend it for that reason," (etc.)

(Here's who said it—) a reprint from:

U. S. GOVT. REP., Bulletin 95, June 30, 1911, pp. 44-46.

WHEN YOU BUILD (palace, cottage or pasture fence)
Why not "Stop Depreciation Before it Begins—*Use CYPRESS At First!*"

WHEN "FIXING UP" (big new porch or little back steps)
"Why Replace Rotten Wood *with Wood that Will Rot?*" (*Use CYPRESS, of course.*)



WRITE TODAY for VOLUME ONE of the CYPRESS POCKET LIBRARY, with Full Text of OFFICIAL GOVT. REPT. *Also Full List of 32 Other Volumes.* (FREE on request.)

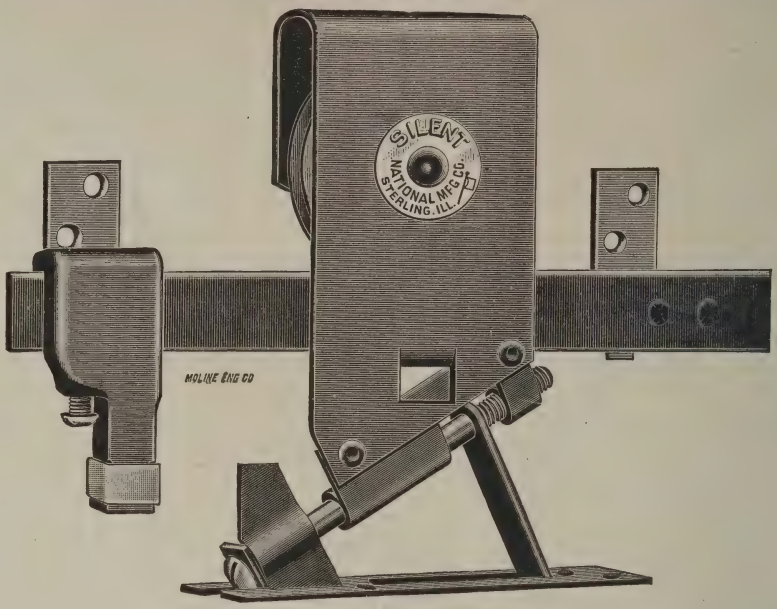
Let our "ALL ROUND HELPS DEPARTMENT" help YOU. Our entire resources are at your service with Reliable Counsel

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION
1212 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

INSIST ON CYPRESS AT YOUR LOCAL DEALER'S. IF HE HASN'T IT, *LET US KNOW IMMEDIATELY*

The best carpenters are more and more favoring Cypress because it is easy to work, easy on edged tools and is such a faster that owners are pleased, and that's a good thing for the reputation of the builder also. "Just Tim" Rose. F.E.O.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



"SILENT" PARLOR DOOR HANGERS
ARE EASY TO HANG

The most popular feature of this hanger is the ease with which it can be attached to the door. The flexible hinge joint allows the hanger to adjust itself to the top of the door whether square or not. Saves planing top of door to square it up.

Other features are the long adjusting screw with spring-lock nut at the end to keep it from working loose; fibre tread roller-bearing, noiseless wheels; rubber tipped stop and jump-preventing construction.

Send for our catalog showing proper construction of pocket. Sent free.

NATIONAL MANUFACTURING CO.
STERLING, ILLINOIS

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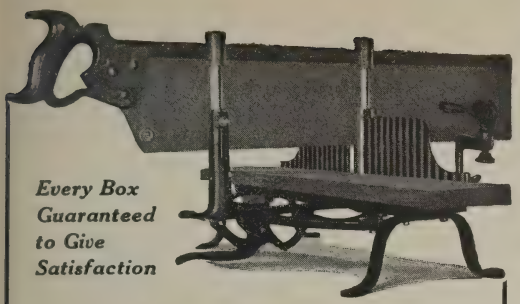
IT WILL HELP.



Every Box Guaranteed to Give Satisfaction

LOOK ONE OF OUR CROWN MITER BOXES FOR

$2.00 down and $2.00 per month. This is our easy payment plan. This Box formerly sold for $12.50. Now $8.95 cash or $10.00 on payments.

We have other bargains in tools. Send for catalogue.

We sell direct to carpenters, giving you the benefit of the middleman's profits.

CROWN TOOL MFG. CO.
OTTUMWA, IOWA

Stanley's Ball Bearing BUTTS

INSURE PERFECTLY HUNG DOORS

Friction is eliminated by the steel bearings, and the door swings smoothly and softly without creaking or binding. These butts have

NON-RISING PINS

which will not work out of the joint. Write for artistic and instructive booklet "Properly Hung Doors."

Department "N"
THE STANLEY WORKS
New Britain, Conn.

The Architects' and Builders' Pocketbook (Kidder).—The Fifteenth Edition. Revised and enlarged. 1,700 pages, 1,000 engravings, morocco binding. Price.....$5.00

In the author's own words, it is "a general index to the many lines of work, methods, materials and manufactured products entering into the planning, construction and equipment of buildings."

The new edition contains extended chapters on fireproofing and reinforced concrete.

A modern construction handbook, indispensable to the professional man and the student of today.

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Modern Carpentry and Joinery. Vol. I. By Fred T. Hodgson. 300 pages, 318 illustrations. Over one million copies have been sold. One of the best books for teaching the young workman the art of correct and easy woodworking. No bewildering formulas and algebraic puzzles. It can be understood by anyone who can read every-day English. Cloth.....$1.00

Vol. II. Similar to Vol. I, on advanced lines. Many of the more difficult problems of construction are solved fully and plainly. The author's method of explanation being adapted to the class of readers most apt to study the subjects. Cloth, postpaid.....$1.00

Send for Complete Catalog

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The Typewriter as a Perpetual Investment to the Architect and Contractor

Fox Model No. 24

Fox Typewriter Company
4410-4710 Front Ave., Grand Rapids, Mich.

The typewriter has made possible the enormous business development of this country.

Fox typewriters can be made a perpetual investment to any Architect or Contractor and if persistently used will double the business of the average man in six months' time. **Read how.**

We will sell you our latest Fox Visible Typewriter, Model No. 24, for a few dollars down, if time is wanted, and the balance $5:00 monthly. Make a list of prospective builders in your vicinity. To each of these write frequent, but short, personal letters. Call attention to some particular building you have just designed or erected and ask the party to inspect it. Show the advisability of buliding at this particular time—materials are lower—help more easily secured—weather conditions favorable. Don't overlook the fact that the great mail order houses of the cities are hard after the small home builder—and they'll get his order, too, unless you adopt their progressive methods by starting a personal letter mail campaign.

This is too big a subject to handle in an advertisement, but it is too important to be neglected by you. Write us today for full particulars, catalog, etc. Now, before you forget it.

The National Builder Enquiry Coupon

Name_____

Address_____

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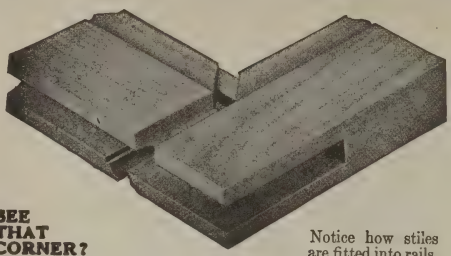


SEE THAT CORNER?

Notice how stiles are fitted into rails.

MADE TO ORDER

Fly Screens and Screen Doors

We use the best grades of wire, black enamel, galvanized, pearl and copper bronze, fastened by the improved **Standard Shoulder Strip Method**, which makes the wire drum tight and firm, can not sag or pull away.

Dealers, Carpenters, Contractors and Builders, write for a free copy of our 1912 illustrated catalog

STANDARD SCREEN CO., 1848-50 W. 14th Street **Chicago, Ill.**

Our screens are all mortised, tenoned, joined with waterproof glue and pinned with steel pins, will last a lifetime

"TITELOCK" METAL SHINGLES

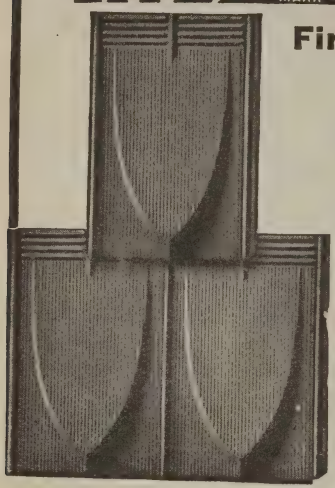
TRADE MARK

Fire, Water and Lightning Proof

Finest in Appearance

Best of Material and Workmanship

Ask For Sample and Catalog

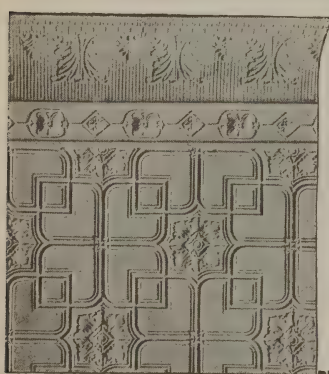


STYLE B. Showing Method of Laying.

STYLE B. Showing Ridge and Hip Finish.

MILWAUKEE CORRUGATING CO.

Kansas City, Mo. Milwaukee, Wis.



METAL CEILING

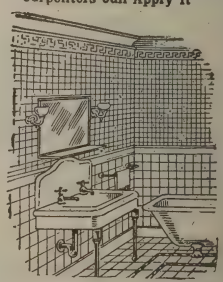
Something exceptional—out of the ordinary class—and as plain or elaborate as you like. Patterns especially adapted for residence work. Nothing better for a new house or to repair an old one. Catalog.

NORTHROP, COBURN & DODGE CO.

30 Cherry Street, :: NEW YORK

METAL TILING

For the Kitchen and Bathroom Carpenters Can Apply It



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Main Part of This Roof is 24 Years Old; The Addition 6 Years; "You Can't See Any Difference"

Huntingtown, Md., Sept. 7, 1912.

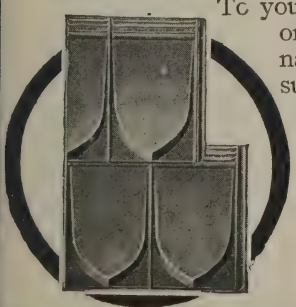
GENTLEMEN:—A portion of the home of Dr. I. N. King, Barstow, Md., was built about 24 years ago and covered with *Cortright Metal Slates*. About six years ago we built an addition to it, and also covered it with your roofing and today you cannot see any difference between the roofs.

Yours very truly, LYONS & GIBSON.

Consider This:—Dr. King Decided Upon

CORTRIGHT METAL SHINGLES

for the addition to his building, after having been protected by them from storm, wind, fire and lightning for eighteen years.



To you, as a contractor, this remarkable satisfaction not only helps increase your business, but really eliminates competition by giving you an article far superior to all other forms of roofing.

Let us tell you how we work with you in developing business. **Write us right now for our special offer to Contractors and Builders.**

Cortright Metal Roofing Company

Philadelphia and Chicago

MAIL US THIS COUPON NOW

You may send me book "Concerning That Roof" as advertised in N. B. 11-12.

NAME.....

Street Address.....

City.....

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

WHEN YOU GET TO **SASH CORD** use **SILVER LAKE**

and insist upon getting it from your dealer. To insure you against substitution, we stamp our name upon every foot of our cord. Carried by all dealers.

SILVER LAKE BRAIDED SASH CORD was originated by us, and for forty years has been recognized as **THE STANDARD**

Established 1869

Full Line of Plumbing Supplies

Sold Direct at Wholesale Prices

20 to 40 per cent Saving

Complete bathroom outfits—tubs, closets, lavatories, kitchen sinks, etc. Prompt shipment from a complete stock. The only house selling up-to-date, guaranteed goods at wholesale direct. Write for illustrated catalogue and prices.

B. Y. KAROL, 768-72 W. Harrison St., Chicago, Ill.

TWO MINUTE LOCK MORTISER

Not an experiment but a practical labor and time saving tool.

Thousands of builders have verified our claims. No lost motion, but every stroke of the lever counts. We don't want your money unless it does the work.

Riverside, Calif. A. W. MILLER MFG. CO. Cincinnati, O.

Our Butt Mortiser and Rule Gauge for 75 cents.

The Recessed Steel Medicine Cabinet

HESS MEDICINE SANITARY CABINET LOCKER

The Only Modern, Sanitary, STEEL Medicine Cabinet

or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves. **Costs Less Than Wood.**

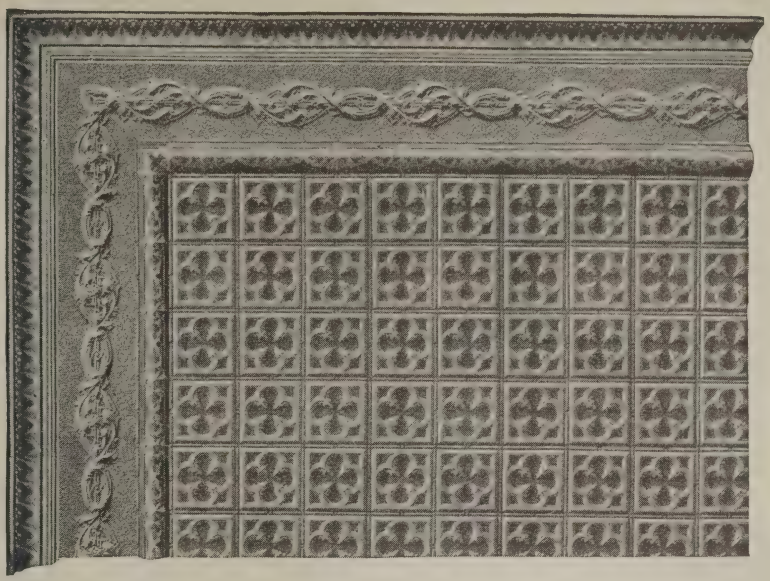
Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned. **Should Be in Every Bath Room.** Four styles—four sizes. To recess in wall or to hang outside. **Send for illustrated circular.**

HESS, 907 L Tacoma Bldg., CHICAGO

Makers of Steel Furnaces. ***Free Booklet.***

The Outside Steel Cabinet

NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Edwards Metal Ceilings and Walls

CARPENTERS CONTRACTORS AND BUILDERS

Here is a chance for you to build up an independent, profitable business for yourself right at home. Many agents are now devoting their entire time to selling our Metal Ceilings. Others have made big profits simply devoting part of their time to selling and applying our Metal Ceilings and Walls. *Write us to-day about your territory.* Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that some one else will be given your territory. *Don't delay. Write today for our special agents' proposition and large, handsome catalog of attractive designs.*

The Edwards Manufacturing Company

"The Sheet Metal Folks"

430-450 Eggleston Avenue, Cincinnati, Ohio

Largest Manufacturers of Metal Ceilings, Metal Shingles, Steel Roofing and Siding in the World

Eastern Representatives: The W. H. Daycock, Jr., Co., 81-83 Fulton Street, New York

Branch Office and Warehouse: 1625-1627 Pacific Avenue, Dallas, Texas. J. F. Agnew, Manager

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"Red Devil" Chain Drill

No. 2012

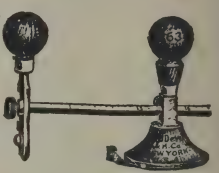
$2.25

It's just *one* of the world-famous "RED DEVIL" Chain Drill Line. It's used with an ordinary bit brace for drilling and no mechanic who uses a brace can get along without it. You can have one sample only for $2.25 prepaid.

"RED DEVIL" TOOLS

"RED DEVIL" CIRCULAR GLASS CUTTER No. 263—$1.25

It's a perfect tool for cutting circles in any kind of glass. It will cut a 2" or a 22" circle absolutely accurate. IT'S A "RED DEVIL" GLASS CUTTER. Your hardware man has it. Get it from him, or one sample only will be sent you postpaid on receipt of $1.25



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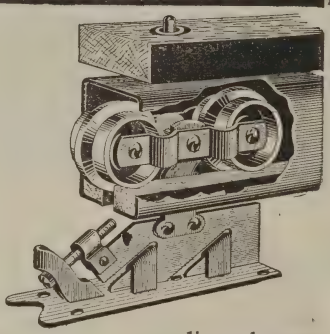
"Every Hanger a Car."



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For they know that the high standard of perfection we have maintained for the past 30 years is an assurance of honest value.

They know too that Richards-Wilcox Hangers embody many improved features unknown to ordinary hangers. Such as forged steel yokes, case hardened bearings and center hung trucks that cause heavy sliding doors to glide easily and noiselessly over the clincher type hard maple tracks. Both hanger and track can, if desired, be removed **after** plastering without injuring or disturbing the walls.

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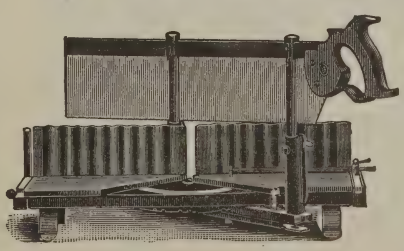

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Automatic stops for holding up saw. Corrugated Backs. Graduated. Gauge for duplicate cuts and many other features. If you want the best you will take no other.

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Established 1872
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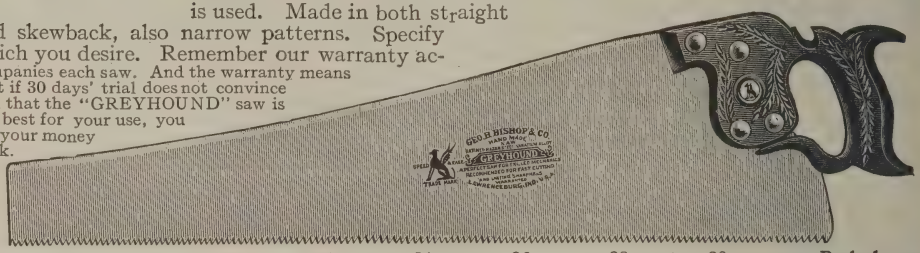

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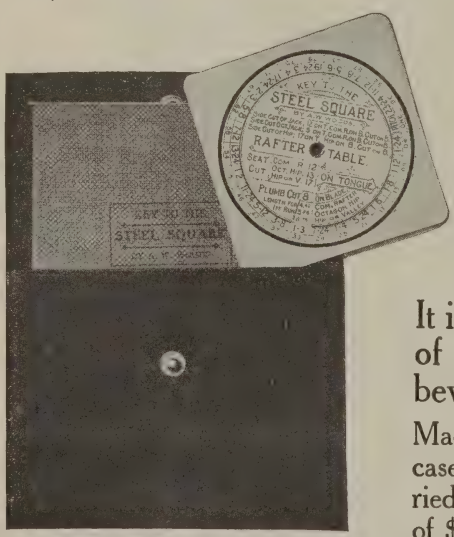

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No money required in advance.

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¶ The wheels on this grinder are made of DIMO-GRIT, the new artificial diamond sharpening substance that cuts steel as emery does copper—just a light touch needed—no water cooling—no danger of drawing temper. 25 times faster than the grindstone—10 times more efficient than emery.

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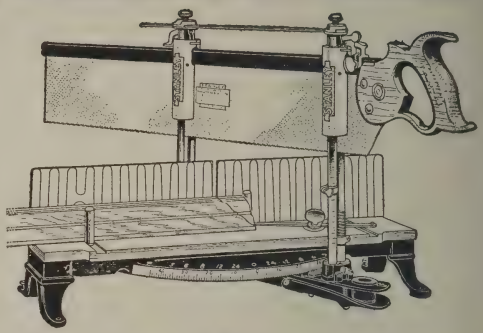

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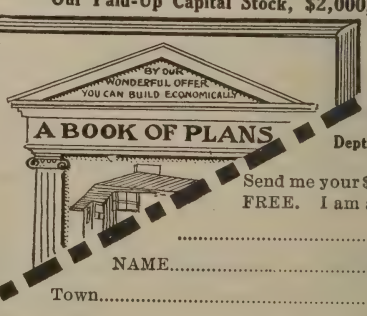

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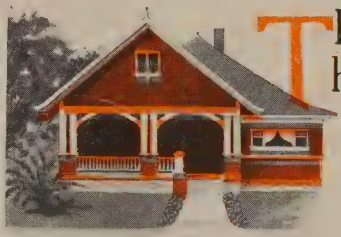


THE NEXT time you need hardwood flooring, whether for house, store or factory—or if only a few hundred feet of 3/8" stock for a job of repairing—order "Steel Polished Perfection." Find out the meaning of **real flooring quality!** See how easy it is to save time, trouble and money by buying flooring that **always** matches easily and accurately, **always** presents a smooth, richly-polished surface—**and never shrinks!**

"Steel-Polished Perfection" HARDWOOD FLOORING

is made in 3/8 and 13/16-inch thicknesses of Beech, Birch, Maple and plain and quarter-sawed Red and White Oak. The new Schroeder Catalogue **packed full of valuable flooring information**—is yours for the asking. Write for a copy today.

Special November Offer on Strictly White Pine Direct to You from Our Idaho Mill

WE offer, at very attractive prices—and subject to prior sale—choice Idaho White pine to be shipped direct from our Idaho mills in carload lots. This lumber is dressed stock, one inch thick—and is **strictly White Pine.** Grades range from No. 2 Common to Select and Better. If you can use a car (20,000 to 25,000 feet) of **exceptionally rich stock** at **exceptionally low prices,** let us hear from you.

We are lumber manufacturers—owning our own forests, saw mills and planing mills. If **quality lumber at low prices** means more to you than **"bargain" lumber**—send us you bills for estimate.

John Schroeder Lumber Co.

Foot of Pleasant Street, - - Milwaukee

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

20.3
T17

THE NATIONAL BVILDER

for DECEMBER, 1912

Stucco House in Western New York ✦ Arthur P. Coon, *Architect*

For WORKING PLAN *and* ESTIMATE OF THIS HOUSE

SEE SUPPLEMENT *and* PAGES 35-36-37. ✦ ✦ ✦ ✦ ✦

8TH YEAR ⁘ ⁘ ⁘ ⁘ PRICE 15 CENTS

PUBLISHED BY

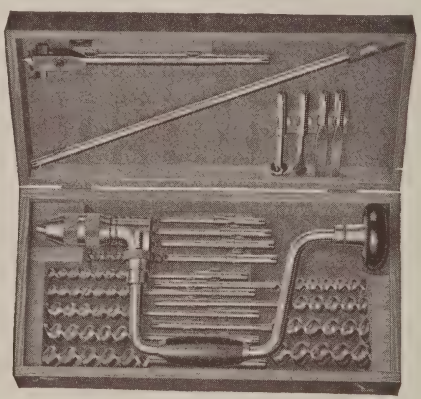
Porter-Hodgson Co.

Some Suggestions for Christmas Presents

Give your boy who already shows such skill with his hands a set of

Russell Jennings Precision Tools

for Christmas. It is a man's gift to a manly boy. Give your friend that prides himself on his workmanship a set of Russell Jennings Bits. He will use them a long while and will think well of you every time he uses them. It will cost less than you would squander on some toilet article that would never give him half as much service.



And give yourself a present of a set of Russell Jennings Tools. You will be pleased with them and with yourself for having purchased them. They cut cleaner and faster than other bits and they never choke or clog. Your hardware dealer will show the full line.

Russell Jennings Mfg. Co.
CHESTER, CONN.

21-101

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Build Right Through the Winter

Save a Month's Time and Half Plastering Cost

Don't let the cold weather and damp plaster delay your building. Use Bishopric Wall Board on any building job in any kind of weather. The finer the house or bungalow, the better the owners will be pleased.

You can save a month's time in building a house by using Bishopric Wall Board.

Comes ready to use—goes on dry. Just nail Bishopric Board to bare studding and walls and ceilings are ready at once for paper, paint, kalsomine, burlap or any kind of decoration. Anyone who can drive nails can apply it. Lasts as long as the building.

Bishopric Wall Board costs 50% less to apply than lath and plaster.

BISHOPRIC WALL BOARD

Stays Stiff—Can't Warp

Bishopric Wall Board is the **only** wall board made with lath reinforcing It is the **lath** that keeps wall board **stiff.** Kiln-dried dressed lath are imbedded in toughened Asphalt-Mastic under terrific pressure, and a layer of heavy sized fibre board is pressed over the surface. It makes a sound-proof, moisture-proof, fire-resisting material that **stays stiff.**

Testimonial Letter

Find enclosed twenty-two dollars ($22.00) for which ship to G. L. Snapp, Tiona, Pa., freight prepaid, eight (8) squares of Wall Board. The lot I got before is giving good results. It is O. K.

G. L. SNAPP, Carpenter and Builder, Saybrook, Penn.

$5,000 Anti-Warp Bond

Bishopric Wall Board will not warp, crack, buckle or pull loose in any climate, winter or summer. This claim is backed by a $5,000 Anti-Warp Bond guarantee. Every purchaser is protected by this guarantee.

$2.50 Per 100 Square Feet

Comes in sheets 4 feet square, ready to apply. Price: $2.50 for 100 square feet; $6.40 per crate of 16 sheets, 256 square feet. You can nail it to studding and have room ready for decorator the same day.

Write for FREE Book and Big Sample

FREE SAMPLE

Send for Free Bishopric Book in colors; Big Sample of nonwarping, fire-resisting Wall Board and working architectural Plan of Model House. They will give you ideas. They may save you money. Enclose 6c for postage and packing. Write today.

The Mastic Wall Board and Roofing Mfg. Co.

336 Este Avenue CINCINNATI, OHIO

DEALERS: Write for Great Exclusive Agency Proposition.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Wall Board
Painted with
DULLKOTE

A wall board interior, with Dull Kote, is sanitary, artistic and lasting, and can be washed with a sponge like tile. It permits of tasteful decorative effects, is easily applied and economical in use.

The above are only a few of the many reasons why it is the ideal wall covering for

RESIDENCES, SCHOOLS, CHURCHES, STORES, PUBLIC BUILDINGS

But be sure it's Dull Koted.

Johnston's Dull Kote Paint contains no white lead or anything injurious. It will not rub, flake or peel off, dries hard with a washable surface, free from brush marks or laps.

We will send any Architect, Carpenter or Owner our free color folder and valuable suggestions for interior decoration. Send your name in today.

The R. F. Johnston Paint Co.

Pearl and Main Streets, Cincinnati, Ohio

Quit Wasting Your Profits

Go to it!—If you'd rather pay a week's wages to six skilled carpenters than buy a gallon of gasoline a day. The Eveready Saw Rig won't talk as much as the six men; but it will do more work than they can—and BETTER work. Yes, on ANY job you've got. No, you are not expected to believe it offhand—but you are asked to send for the Eveready outfit and try it out the hardest way you know how. Many another contractor, builder, jobbing carpenter has done that—and profited by it. Six men's pay—or a gallon of gasoline—that's the difference.

On sawing jobs alone the EVEREADY will do more work than any six men you can find. Take it on a Free Trial for a week and make it show you. Don't buy it unless it does show you. Put it to the test, on your own work, in your own way—not the slightest obligation to buy it unless it makes good for YOU—at a huge saving.

TRADE OSHKOSH MARK

With an EVEREADY you are independent of any planing mill's facilities. For it does everything a well-equipped planing mill can do for you now—and all you pay for the doing is a gallon of gasoline a day! If it won't cut your costs fully ten per cent, you are an exception. Try it a week at our expense—NOW.

EVEREADY SAW RIG

Every Attachment FREE!

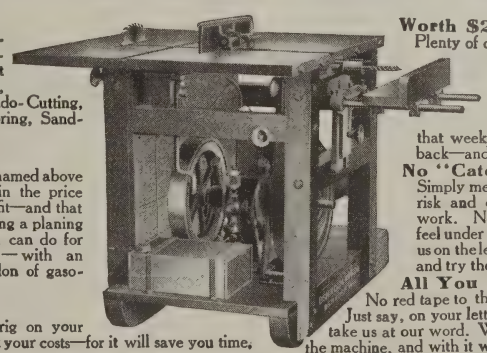
Each EVEREADY Portable Saw Rig comes carefully equipped for Cross-Cut Sawing, Ripping, Jointing, Mitering, Rabbeting, Dado-Cutting, Jig Sawing, Mortising, Boring, Sanding and Tool Sharpening.

No Extras to Buy

For each of the operations named above a special tool is included in the price of the EVEREADY outfit—and that price is a low one. Anything a planing mill does for you now you can do for yourself—at a big profit—with an EVEREADY and a gallon of gasoline a day.

Cuts Your Costs

An EVEREADY Saw rig on your work will do more than cut your costs—for it will save you time, give you facilities for special work, like heavy framing jobs—and equip you to handle ANY woodworking contract whatever.



Worth $25.00 a Week

Plenty of contractors testify to a saving of $25.00 a week made by their EVEREADY outfits. You try it for yourself, ONE WEEK FREE—and if it doesn't save you ten dollars that week on sawing jobs alone, send it back—and we'll apologize.

No "Catch" to This Offer

Simply means what we say—try it at our risk and cost—six days—on your own work. Needn't favor it a bit. Needn't feel under the least obligation. Consider us on the level, and our offer on the square, and try the outfit for yourself.

All You Need Do

No red tape to the EVEREADY proposition. Just say, on your letterhead, that you are willing to take us at our word. We will attend to the shipping of the machine, and with it will come every instruction a kid apprentice would need to erect and operate the equipment. You can't lose by taking up with this offer—why don't you take it up right away?

Oshkosh Manufacturing Co.
414 South Main Street
Oshkosh - Wisconsin

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

MAKE A COMPARISON

AND YOU WILL USE

Bestwall FIRE PROOF WALL BOARD Bestwall

IT IS NOT MADE OF WOOD PULP OR PAPER

IT WILL NOT WARP

Bestwall is a real building material, not a flimsy, make-shift construction

TRADE PRICES TO CARPENTERS

Write for full information

BESTWALL MANUFACTURING COMPANY
First National Bank Building, CHICAGO

BETTER MILLWORK

Plans by Geo. F. Barber & Co.
Knoxville, Tenn.

Mr. Contractor, Are You Satisfied

that you are getting the best quality and service in Millwork and lumber that your money will buy? If not, let us prove to you that our "BETTER MILLWORK" and lumber is right in quality and manufacture, and that it will make you a 15 to 25% saving on every job.

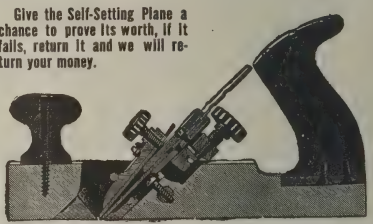
Write us now—we figure Millwork from plans

Chicago Riverdale Lumber Co.

13537 Indiana Avenue
RIVERDALE, CHICAGO

INTRODUCTORY TRIAL OFFER

Give the Self-Setting Plane a chance to prove its worth, if it fails, return it and we will return your money.



If the SELF-SETTING PLANES are not sold in your town and you write us saying, "I saw your trial offer in N. B.," we will send you particulars, a carpenter's pencil and our $1.00 CERTIFICATE, which we will receive as $1.00 in part payment for a SELF-SETTING PLANE, as stated in our $1.00 CERTIFICATE, and if this S. S. PLANE is unsatisfactory and returned at our expense, we will send you $1.00 more than you sent us, as the $1.00 CERTIFICATE says.

As this paper guarantees we will do as our advertisement says, you know the plane must be O. K;

ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained eaty, knurly, knotty, hard or soft wood you can find, THAT IS FREE FROM SAND OR DIRT.

If it is not worth to YOU or YOUR MEN, TWICE ITS COST, return it at our expense, as above stated.

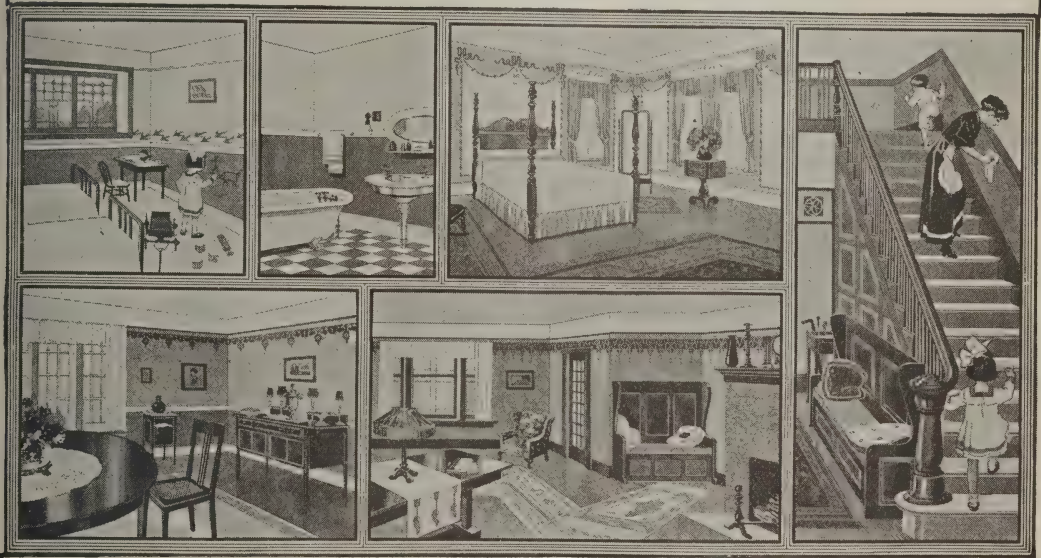
If you send us the addresses of ten carpenters, no matter where they live, we will send you another carpenter's pencil, hard and tough.

Carpenter's Hard, Tough Pencils, 30c per dozen postage prepaid.

GAGE TOOL COMPANY, Vineland, N. J.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Don't Figure on 1913 Decorating Jobs without Working Samples of this Successful Combination—



Alabastine

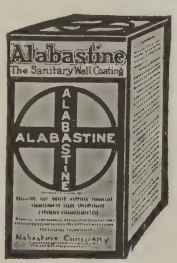
The Beautiful Wall Tint

In dry powder, ready to mix with cold water, applied with a regular 7 or 8-inch wall brush; packed in full 5-lb. packages, in white, tints and colors—also in bulk for large jobs.

Alabastine may be easily washed, if desired, from any surface to which it has been applied.

Alabastine, after being mixed, will remain in working condition for days, does not harden nor set in the bucket.

Full 5-lb. packages; white, 50c regular tints, 55c. Also in bulk for large jobs—Hotels, Offices, Schools and Public Buildings.

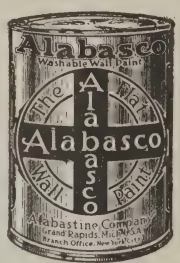


Alabasco

The Flat Wall Paint

Alabasco is the highest grade interior flat wall paint produced. It is washable and absolutely dependable. For homes we recommend the use of Alabasco in connection with Alabastine. At a little extra cost Alabasco can be used in places exposed to finger marks—along the stairs, nursery, lower part of bathroom and dining room, also kitchen and cupboards. These exposed places can be washed with soap and water.

Alabasco comes in the same velvet-like water color tints as Alabastine. Is exquisitely soft and artistic on the walls, and, properly applied, does not chip, peel or rub off. Comes in liquid form ready for use.



1913 Working Samples Free

The Alabastine Co.,

740 N. B. Grandville Road, Grand Rapids, Mich.

Desk 40 N. B. 105 Water Street, New York City, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

OUR OWN GUARANTEED BAND SAWS
Genuine Swedish steel, replaced free if not O. K.
(Brazed, Set and Filed, Ready for Use)

Net Prices:	3/16″ & ¼″	⅜″	½″	⅝″	¾″	1″	1¼″	1½″
10′ to 14½′ Long	$ .90	1.05	1.10	1.25	1.50	1.80		
15′ to 16½′ "	1.00	1.10	1.15	1.40	1.65	2.00	2.50	3.00
17′ to 18½′ "	1.10	1.25	1.35	1.50	1.80	2.15	2.75	3.25

Other Sizes at Proportionate Prices

All Orders Filled Same Day Received

CIRCULAR SAWS RIP OR CUT-OFF

Diam.	Price
8″	$1.20
10″	1.65
12″	2.20
14″	2.65
16″	3.25
18″	4.00

Be sure to state whether Rip or Cut-off, and size of bore. Also number of teeth to inch. Special Saws and Dado Heads.

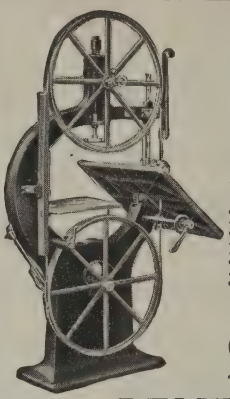
Less 5% For Cash With Order

Planer Knives, Bits and Cutters

Of Every Description

SEND US A TRIAL ORDER

OUR SERVICE (as well as our Prices and Quality) WILL KEEP YOU ON OUR BOOKS.



SPECIAL

48 Band Saws at these Special Prices as long as they last.

20″	345 lbs.	$30
26″	700 "	$55
32″	1000 "	$72
36″	1300 "	$89

5% Discount for Spot Cash

ORDER NOW If not RIGHT, send it back AT OUR EXPENSE.

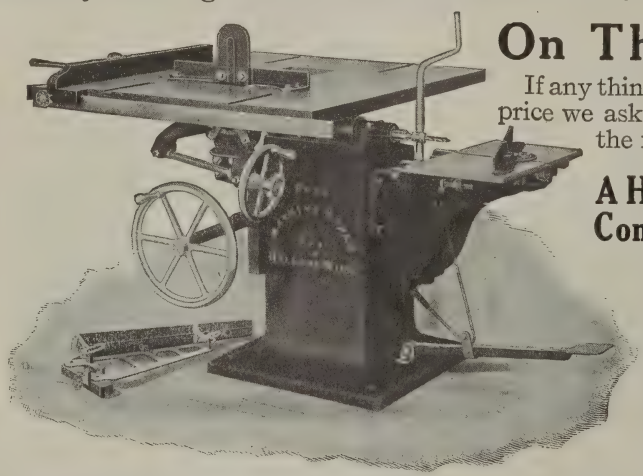
REMEMBER

We carry the Largest Stock of both New and Rebuilt (Guaranteed) **Woodworking Machinery** in the U. S. Woodworkers' Tools and Supplies of every description.

SERVICE!!!

Here's $350.00 Quality for $195.00

Contractors and Builders: Don't Buy "Shoddy" Stuff or Toys when you can get **REAL MACHINES** of the **HIGHEST QUALITY**



On This Guarantee:

If any thing we sell you is not worth the price we ask, send it back, and we stand the freight both ways.

A High Grade Tilting Table Combination Saw,

Dado, Jointer, Tenoner, Boring Machine, Hollow Chisel Mortiser—in fact a whole woodworking plant in one tool—complete with one each 14″ Rip and Cut-off Saw, ½″ to ¾″ x 8″ Dado Head, 5″ Jointer Head and Knives, 3″ Tenoner Head and Knives, 4 Boring Bits, 2 Hollow Mortising Chisels and Bits, for **$195.00**

ORDER TODAY ON TRIAL—If it don't suit you, send it back at our expense.

CHICAGO WOODWORKING MACHINERY CO.

162-166 N. Clinton St. *(COME IN TO SEE US)* **CHICAGO, ILL.**

NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Put Utility Wall Board on right over the studding—do away with all the muss and dirt and bother of lath and plaster—and you will have walls and ceilings that will last as long as the house stands.

UTILITY WALL BOARD

is a strong, durable fibre board—It is put together with two insulations of natural waterproof asphalt, rolled under tremendous pressure into one solid compact sheet and surfaced on both sides with special moisture proofing—It will not warp or crack or shrink—It may be decorated in any style desired—It is very durable and less expensive than lath and plaster.

Use it in new construction or in repair work. Put it on over old, cracked plaster if you wish.

There is a free sample here for you—if you write

THE HEPPES COMPANY

4502 Fillmore Street **Chicago, Illinois**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE STANDARD PORTABLE COMBINATION WOODWORKER

NINE MACHINES IN ONE EQUIPPED WITH 6 H. P. ENGINE

SEND FOR ILLUSTRATED CATALOGUE

ATLANTIC ENGINE COMPANY, Inc.

MERCER STREET - - - - - MEADVILLE, PA.

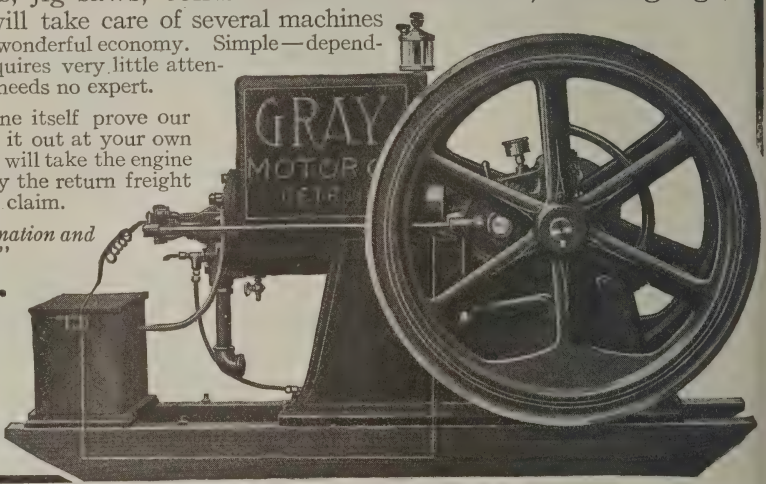
CANADIAN OFFICE, BRIDGEBURG, ONT.

RELIABLE POWER FOR THE CONTRACTOR AND BUILDER

HERE is just the engine you need—has no superior at shop work, either portable or stationary. Runs band saws, emery wheels, cutoff saws, jig saws, combination woodworkers, hoisting rigs, cement mixers, and will take care of several machines belted to line shaft with wonderful economy. Simple—dependable—long lived and requires very little attention. Engineers itself—needs no expert.

30 Days TRIAL Let the engine itself prove our claims. Try it out at your own work and we will take the engine back and pay the return freight if it is not everything we claim.

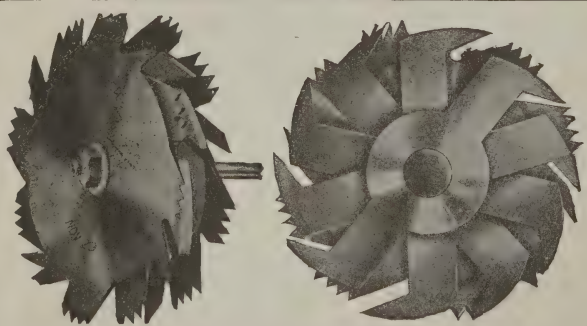
Write today for full information and ask for Engine Book "S."



Gray Motor Company

1281 G. M. C. Bldg.

DETROIT, MICH.



Showing Arrangement of Cutters

HUTHER BROS. PATENT GROOVER OR DADO HEAD

Will Save Cost in Three Days Use

Can Be Used on Any Circular Saw Mandrel

For cutting any width groove from ⅛" to 2" or over. Will cut a perfect groove, either with or across the grain, and leaves edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

HUTHER BROS. SAW MFG. CO.

500 University Ave. Rochester, N. Y.

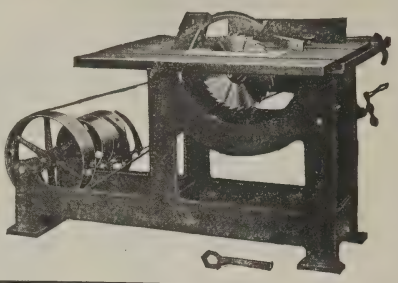
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

SILVER'S NEW WOOD-WORKING MACHINES

Saw Tables, Jointers, Swing Saws, Band Saws—tools of good, honest construction, newest improvements and conveniences; patterns fresh from the designers.

Jointers—8, 12, 16, 20 and 24-inch. Band Saws—20, 26, 32 and 36-inch. Swing Saws—6½, 7, 7½ and 8-foot.

Silver's machines are high-pressure machines. They will do your work and do it well, save you money and labor, suit you in sizes, and in prices, too. ¶ Post up on these tools. Ask for our printed matter at once.



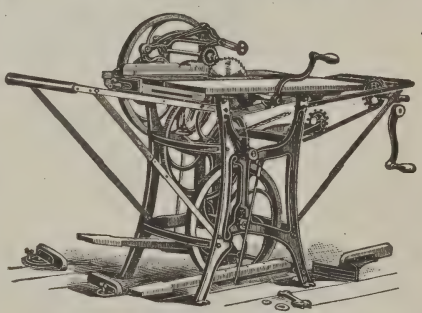
THE SILVER MFG. COMPANY

340 BROADWAY - - - - SALEM, OHIO

FOOT, HAND AND LIGHT POWER

Wood-Working Machines

Carpenters, Builders, Cabinet-Makers and other wood-workers can successfully compete with large shops by using our labor saving machinery. Save for yourself some of the profits you have been paying to the mills. With our machines one man will do as much work as four to six men using hand tools; will do it easier; will do it better.



No. 5 "Union" Self Feed Rip and Cross-Cut Saw

"Victor" Scroll Saw.

"Diamond" Mortiser

Send for catalog "A" describing our complete line

THE SENECA FALLS MFG. CO.

629 Water Street SENECA FALLS, N. Y., U. S. A.

(249)

Barnes Hand and Foot Power Machinery

Complete Outfit for CARPENTERS AND BUILDERS

Improved Former has an adjustable table. Knives can be instantly reversed to suit the grain of wood. Speed of knife is 2,500 per minute, thus insuring smooth work.

Improved No. 7 Scroll Saw

Warranted to be well made; will saw pine three inches thick at the rate of one foot per minute. Other woods in same proportion according to hardness. Price, $15.00.

We make Sixty Styles of Knives
SEND FOR NEW CATALOG

W. F. & JOHN BARNES CO.

436 RUBY STREET
ROCKFORD, ILL.

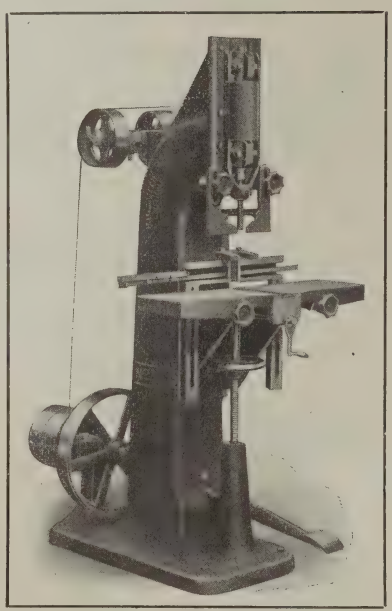
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

SMITH OF SMITHVILLE EVER SO

Woodworking Machinery

A NEW

Power Mortiser



THE halftone represents our No. 282-A, **Automatic Hollow Chisel Mortiser.** The Chisel drives into the work by **power** and will work all kinds of woods rapidly. Send for circulars.

H. B. SMITH MACHINE CO.

Smithville, N. J., U. S. A.

New York Chicago Atlanta San Francisco

DO NOT WAIT FOR BLUE PRINTS

THE BUCKEYE ELECTRIC BLUE PRINTING MACHINE

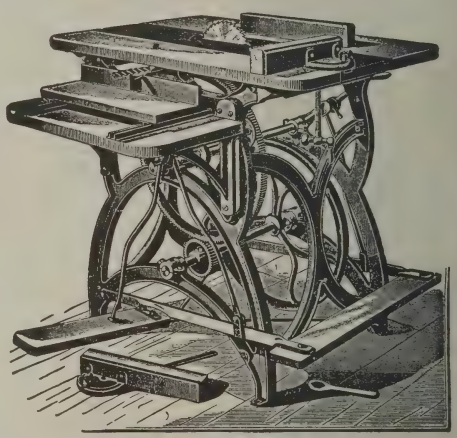
Will make more prints at lower costs, without delay than can be made with sun print frames.

This is proven daily. Used by hundreds of satisfied users.

Ask us to send booklet "THE SUN THAT NEVER SETS."

BUCKEYE ENGINE CO.

SALEM, OHIO



MARSTON'S

Hand and Foot Power Circular Saw

Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two [illegible]-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

Send for Catalog

J. M. MARSTON & CO. 193 Ruggles Street BOSTON, - MASS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Does All Your Woodworking at 20c per day

You can buy a dozen woodworking tools and build a special shop.

You can have your woodworking done outside at current prices.

But you can't get *better* service or *more accurate* work than this unique woodworking outfit will give you — *at a cost of but 20 cents per day.*

A Complete Woodworking Plant Ready for Instant Service—Anywhere.

In a concise, corner-fitting outfit, you get saw, jointer, sander—twelve machines in all.

No delays. No idle machines. A man readily wheels this tool to the spot needed and does the work at once.

This is the original portable saw rig—embodying wide experience in the manufacture of concise, convenient and sturdy tools. Driven by self-contained gasoline engine or can be connected for belt drive.

Write today for descriptive folder showing different sizes and prices

C. H. & E. MANUFACTURING COMPANY, Inc.
319 Mineral Street **Milwaukee, Wisconsin**

Fox
"Universal"

WOOD TRIMMERS FOR INTERIOR FINISHING

Give the refinement of finish demanded by builders today. PERFECT JOINTS ARE ASSURED by using a Fox Trimmer.

Write Today for Literature and Prices

Fox MACHINE CO.
643 Front Avenue
GRAND RAPIDS, MICHIGAN, U. S. A.

When *price* is a consideration, use

Roberds Ideal Wall Board

It costs much less than lath and plaster and is easy to put on. Saves time, labor, dirt, confusion, money and disappointment. Makes a beautiful interior which can be painted, kalsomined or papered. Lasts forever and is proof against vermin, heat, cold, fire and water. Does not peel, crack, chip, sag or warp.

Roberds Ideal Wall Board comes in sheets all ready to be nailed to the studding. Your cheapest man can apply it. Your customer will be delighted because it means a better job for less money.

Write today for catalog, samples and testimonials from other contractors.

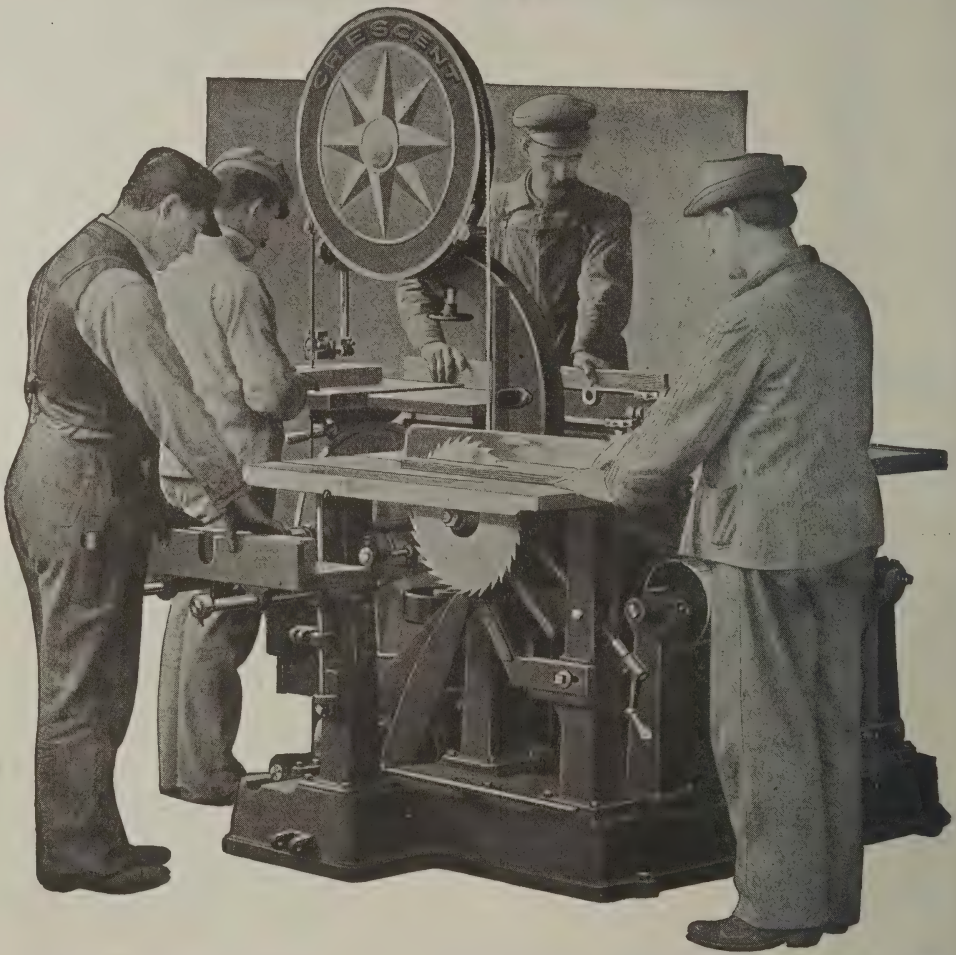
THE ROBERDS MFG. COMPANY
000 Railroad Street **Marion, Indiana**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

INCREASE THE PROFITS FROM YOUR BUILDING OPERATIONS BY TURNING OUT YOUR MILL WORK ON THE

CRESCENT UNIVERSAL WOOD WORKER

FOUR MEN CAN WORK ON THE MACHINE AT ONE TIME



THE CRESCENT UNIVERSAL WOOD WORKER

consists of band saw, saw table, jointer, reversible single spindle shaper, and borer. Various attachments can be added adapting the machine for grinding knives, doing disk grinding, mortising, tennoning, panel raising, resawing, making mouldings, rabbetting.

Send for special catalog No. 51 and find out all about this splendid machine. At the same time ask for catalog of band saws, jointers, saw tables, planers, shapers, variety wood workers, swing saws, disk grinders and borers.

THE CRESCENT MACHINE COMPANY, 10 Main Street, LEETONIA, OHIO

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

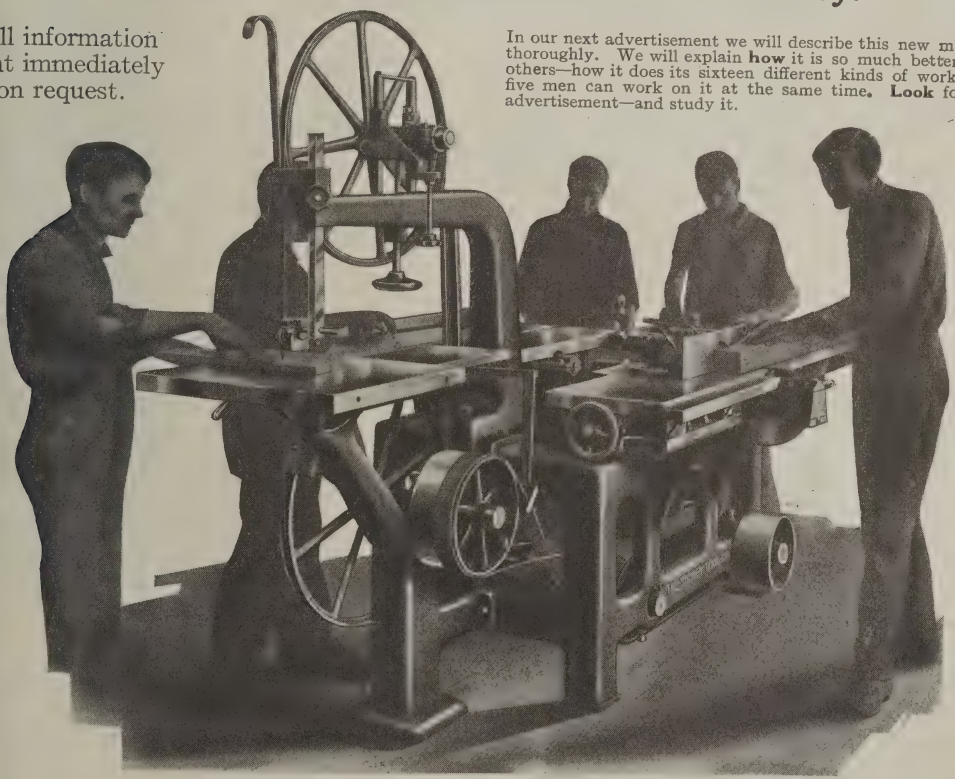
The Woodworking Wonder of the Age!

THE FAMOUS "30"

marks the highest point yet reached in Universal Woodworkers. In ease of operation, multiplicity of work and all-around economy, the New Improved Famous No. 30 sets the highest standard of efficiency.

Full information sent immediately upon request.

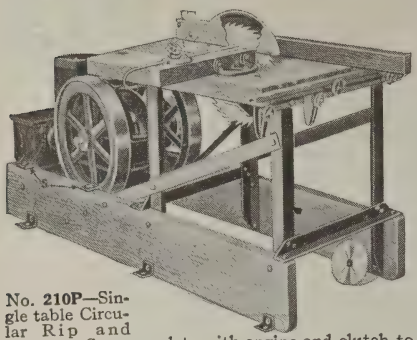
In our next advertisement we will describe this new machine thoroughly. We will explain **how** it is so much better than others—how it does its sixteen different kinds of work—how five men can work on it at the same time. **Look** for this advertisement—and study it.



The Sidney Tool Co., Sidney, Ohio

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Parks Portable Single and Combination Woodworking Outfits



No. **210P**—Single table Circular Rip and Cross-cut Saw complete with engine and clutch to start and stop saw, belted up ready for use, ... **$67.50.**

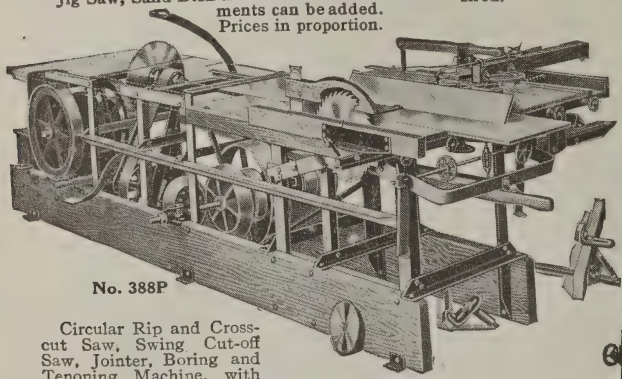
Here is a combination woodworker you can move about anywhere in your shop, or it can be drawn behind wagon or automobile to any job. Illustration does not show wheels or trucks, but can be furnished.

These Parks latest improved portable single and combination woodworking machines can be equipped with gasoline engine, electric motor or attachments for driving with automobile if desired.

This is same machine as No. **210P**, with Jointer, Tilting Guide, Band Saw and Boring Attachments added. We can furnish pulley on engine shaft, also friction clutch to run circular saw or band saw independent of the other, if desired.

No. 3 20P

Jig Saw, Sand Disk and other valuable attachments can be added. Prices in proportion.

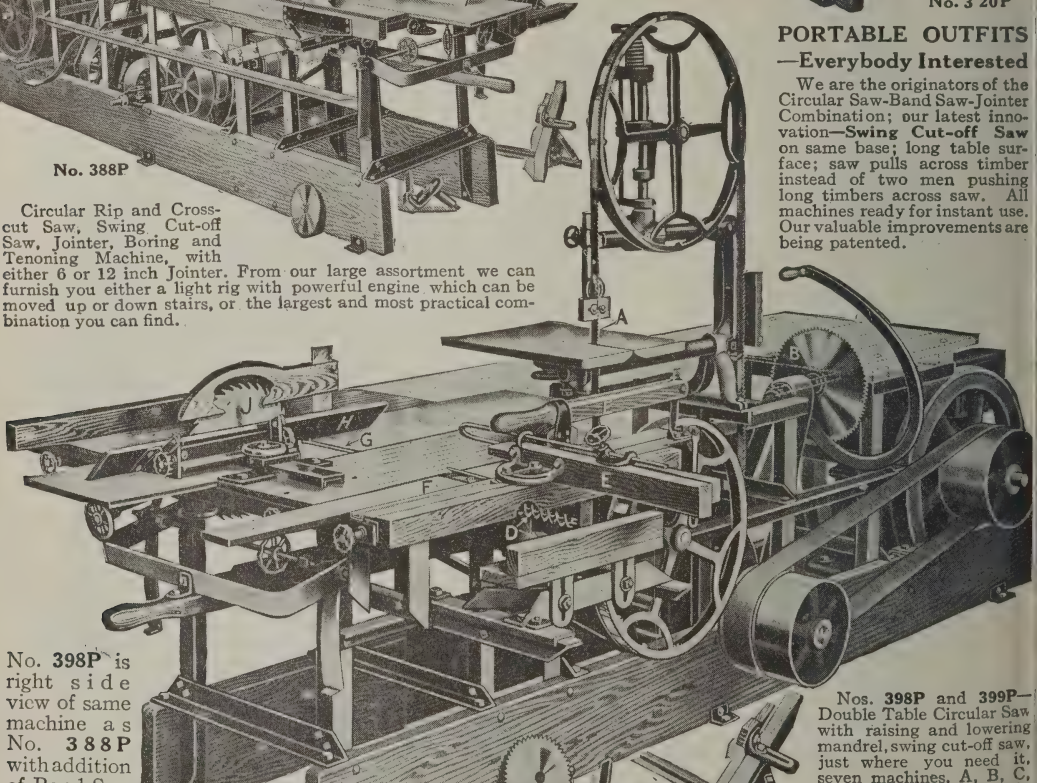


No. 388P

Circular Rip and Cross-cut Saw, Swing Cut-off Saw, Jointer, Boring and Tenoning Machine, with either 6 or 12 inch Jointer. From our large assortment we can furnish you either a light rig with powerful engine which can be moved up or down stairs, or the largest and most practical combination you can find.

PORTABLE OUTFITS —Everybody Interested

We are the originators of the Circular Saw-Band Saw-Jointer Combination; our latest innovation—**Swing Cut-off Saw** on same base; long table surface; saw pulls across timber instead of two men pushing long timbers across saw. All machines ready for instant use. Our valuable improvements are being patented.



No. **398P** is right side view of same machine as No. **388P** with addition of Band Saw

Nos. **398P** and **399P**—Double Table Circular Saw with raising and lowering mandrel, swing cut-off saw, just where you need it, seven machines, A, B, C, D, E, F, G, J—all set ready for instant use. Select the machines you need now—add the others later.

Catalog on Request

Parks Ball Bearing Machine Co.

Knowlton and Fergus Sts. CINCINNATI, OHIO, U. S. A.

NAT BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Greatest Building, Contracting, and Architectural Library in the World

This Library of Architecture is a part of the 111 volumes of the International Library of Technology that cost over $1,500,000 in its original preparation. It contains the results of years of experience of the best building experts in the country. It contains the best modern practical methods used in every branch of architecture. The matter has been written by the foremost technical building experts and illustrated by a special staff of artists and craftsmen. Not only is the Library suited for architects already well trained in their profession, but it is especially adapted for the use of laborers, carpenters, and contractors that wish to acquire in the easiest and most thorough manner the knowledge that will qualify them for advancement. This Library is the only practical technical library in existence wherein the subjects treated can be readily understood and practically applied by persons having no knowledge of higher mathematics.

The volumes of the International Library of Technology are used and indorsed by 182 of the leading colleges and universities throughout the country. They are also indorsed by leading engineers. An example of these indorsements is to be found in the statement of **Frank L. Mueller, Assistant Secretary of the O'Rourke Engineering Construction Company, of New York,** who states: **"Some time ago I received several volumes of your Library of Technology, and it will certainly give you pleasure to know what I think of these books. I have at my disposal a reference library containing more than one thousand engineering books, but I must say that none of these works contain the information generally desired in such concise and simple form as the volumes of your Library of Technology."**

There are 10 volumes in this Architectural Library, beautifully bound in three-fourths red morocco, stamped and numbered in gold, printed on a very high-grade book paper, and fully and practically illustrated. They may be purchased in sets of five or more volumes. Each volume is 6 × 9 inches in size. For full information,

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Please send, without further obligation to me, full particulars in regard to your Library of Technology, with special reference to your Architectural Library.

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*City*_____ *State*_____

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

U. S. GOVERI

(Dept. of Agriculture,
issued June 3

CYPR

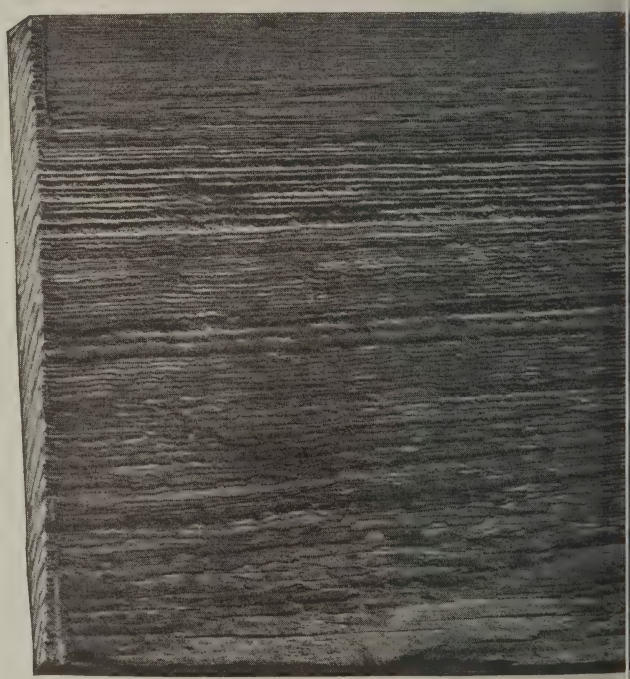
"As Siding It Practically W

(FROM PAGE 44, U. S. G

Same report says "CYPRESS" shows paint well an

(*You Know the Conservat*

Here's a Photograph, (straight from the wood) of a piece of *Cypress Siding* taken from St. Charles College, La., duly attested in writing by the President, Father Maring. Built 1819—torn down 1910. *NOT A TRACE OF ROT.* Note that the lower or exposed edge, originally the thicker, has become the thinner by the simple erosion of nearly a century of rains.



CYPRESS SIDING SOUND as a DOLLAR after withstanding the tempests of a century and willing to start again. *91 YEARS "ON THE JOB" WITHOUT EVEN PAINTING,* on a church in use till the day it was razed to make room for a larger building, and the *CYPRESS LUMBER COMPOSING IT THEN USED AT ONCE* to erect a new gymnasium!

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

MENT REPORT

rest Service, Bulletin 95)
1911, says of

ESS:

ears Out Before It Decays"

ERNMENT BULLETIN 95)
holds it for many years, but lasts a long time without it."
of Government Reports)

THERE'S INVESTMENT VALUE WORTH WHILE!

WRITE TODAY for VOLUME ONE of the CYPRESS POCKET LIBRARY, with Full Text
of OFFICIAL GOVT. REPORT as quoted above. (Sent FREE *promptly* on request)

"WOOD THAT WILL STAND THE GREENHOUSE TEST WILL STAND ANYTHING"

ASK FOR VOL. THREE—ALSO FULL OF VITAL FACTS

When planning new improvements or repairs to old ones, just remember—
"With CYPRESS, you BUILD BUT ONCE"

Let our "BUILDERS' HELPS DEPARTMENT" help YOU.
Our entire resources are at your service with Reliable Counsel.

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1212 Hibernia Bank Building, New Orleans, La.

INSIST ON CYPRESS AT YOUR LOCAL DEALER'S.
IF HE HASN'T IT, *LET US KNOW IMMEDIATELY*

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Bay State
Brick and Cement Coating

Will protect all concrete or cement construction against damage by moisture, will retard fire, give your building any tint desired, may be used as a tint on brick or wood, is equally advantageous on stucco or concrete houses, in mill, bridge or sewer construction. *Send at once for Booklet No. 10.*

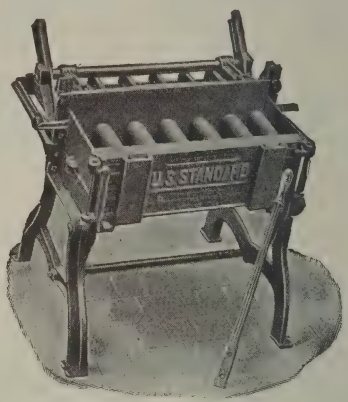
IT WAS USED HERE

GOLF AND COUNTRY CLUB
Situated on border of American Lake, Tacoma, Wash.

Wadsworth, Howland & Co., Inc.
PAINT AND VARNISH MAKERS
AND LEAD CORRODERS
82-84 Washington Street BOSTON, MASS.
New York Office, 156 Fifth Avenue

PROFITS

In block making are dependent on the simplicity of the block machine to operate quickly and with a sureness of turning out each block perfect.



Three reasons why the **U. S. Standard Block Machines** make money for contractors and builders:

Simplicity

With its sturdy and simple construction any amateur can operate it with a few hints on the essential points. No clamps, chains, cogs, wheels or springs to get out of order.

Speed

Its simplicity gives greater speed than more complicated machines. We challenge competition.

Strength of Block

The greater number of small cores instead of two large ones give as much air space and more strength. This is why U. S. Standard made blocks are the nearest to perfection.

Send for detailed information on cost of machine and block making.

The Ashland Steel Range & Mfg. Co.
Ashland, Ohio

N.B. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BONNELL IRIS AGGREGATE

TERRAZO STUCCO

The Synonymous Trio

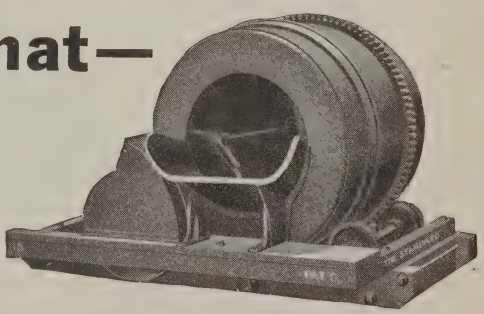
A marvelous blending of pink, green, crystalline white, black and a touch of purple, crushed from the famous **Iris Porphyry Quarries.**

BONNELL IRIS AGGREGATE, Inc.

Have our representative call

501 Fifth Avenue 'Phone 309 Bryant New York City

Do You Know That—



"The Standard" mixer mounted on skids can be placed inside of the building, can be taken through any ordinary door, can be moved by two, will turn out more concrete with less expense and will mix everything from start to finish—concrete cement mortar and several kinds of plaster.

Don't think because winter is coming that you cannot do any more mixing. Secure "The Standard" mixer and mix all through the winter months. "The Standard" mixers are Low Charging, being charged directly from the floor or a very low platform.

"The Standard" Low Charging Concrete Mixer

mounted on a truck has a charging platform only about 2 feet high and attached to the mixer. The Semi-Automatic discharge can be operated from either side of the drum and is the simplest and quickest on the market. The Open Drum allows the inspection of the entire batch while mixing, assuring a high grade uniform mix.

There will be a very interesting exhibit at the Pittsburgh Cement Show in spaces 3-4-5, also at Chicago Cement Show, in spaces 213-214. If you are unable to attend the shows you had better write for our catalog No. 32.

The Standard Scale and Supply Company

Chicago	Pittsburg	Philadelphia	New York
1345-1347 Wabash Ave.	243-245 Water St.	35 South Fourth St.	136 West Broadway

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Lay Your Own Concrete

AS the forests are cut, builders turn to concrete. Concrete construction is not difficult. It pays liberal profits. Hundreds of contractors are going into concrete every year. *You* can start with a small investment—some wheelbarrows, shovels, small tools and a

Smith Hand Mixer

IT is a *batch mixer,* guaranteed to mix a perfect batch in three slow, easy turns of the drum. Cranks easily—popular with the men

Batch capacity 2½ cu. ft. Output, 25 to 30 cu. yards per day. Weight, 1000 lbs. Guaranteed fully by the biggest mixer concern in the United States.

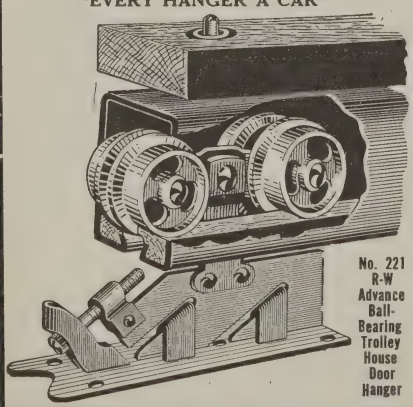
The T. L. Smith Co.
1336 Majestic Building
Milwaukee, Wisconsin

SMITH HAND MIXER 1912 MODEL

Before You Plan or Build Another Residence or Apartment House

We want to send you absolutely **free of charge,** a sample of our improved Richards-Wilcox House Door Hangers.

"EVERY HANGER A CAR"



No. 221 R-W Advance Ball-Bearing Trolley House Door Hanger

We want to place **right** in **your hands** one of these satisfaction-giving Hangers that are so popular with leading architects and contractors throughout the country. For we want to **show** and **tell** you all about the simple but effective adjustments, in both hangers and track, that provide for settling and sagging; the forged steel yokes; the ball-bearing wheels and center hung trucks that insure easy operating doors; the strongly constructed, clincher type, hard maple track that can be quickly and easily removed if required **after** plastering, **without** injuring or disturbing the wall, and a dozen and one other desirable features not found in any other hanger.

In short, we want to **prove** to you that RICHARDS-WILCOX HANGERS are far superior in every way to the hangers you are now using.

This Hanger is yours FREE for the asking. So send for it today.

Richards-Wilcox
MANUFACTURING CO.
AURORA, ILL. U.S.A.
115 THIRD STREET

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

ORR & LOCKETT HARDWARE Co
Established 1872

¶ This advertisement is directed to contractors who do not realize what our forty years of experience and tremendous buying power means to the man who uses

Contractors' Tools and Supplies

¶ In the first place, we carry the largest and most complete line of tools and supplies for carpenters, cement workers, wood workers, electrical workers, masons, etc., in the country. This means that contractors can buy anything needed for the whole job at our store and save time and expense of "shopping around" and placing scattered orders.

¶ In the second place, we are not bound to a single line or brand of tools that vary in quality. We buy saws of the best saw maker, trowels of the leading trowel manufacturer. We seldom fill an order with one line of goods exclusively and the result is no weak link in our shipments anywhere.

¶ The variety of our stock is shown by the fact that you can buy practically any tool advertised in this magazine at our store and find it on the shelves ready for you to take away with you. We can always ship your order at once and our forty years of success is your guarantee that our goods stand upon honor.

Give us your next order for tools and supplies and let us show you.

ORR & LOCKETT HARDWARE Co
Established 1872
14-16 W. Randolph St. CHICAGO, ILL.

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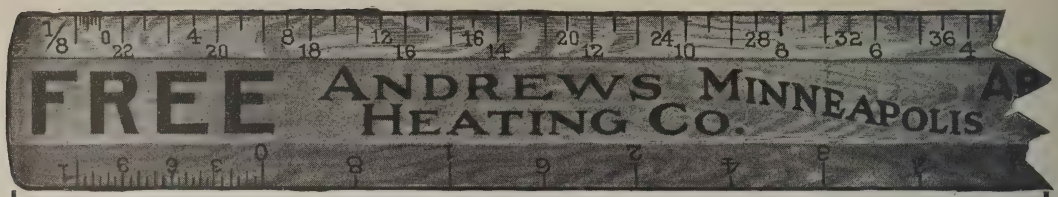
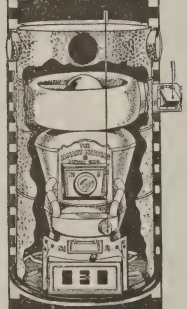


Architect's Scale SEND US TWO OR MORE NAMES of persons who are interested in or want to buy Hot Water Heating Plants and we will send you this scale. Back inches are divided into 6, 10, 12, 16, 20 and 40 parts. Also free catalog on request. Name this paper when writing.

ANDREWS HEATING CO., 1287 HEATING BUILDING MINNEAPOLIS, MINN.

Specify the Jahant Down Draft Furnace



Write for Terms and Free Furnace Handbook

ARCHITECTS! BUILDERS! CONTRACTORS!

DON'T RUN RISKS.

It's an established fact that nine-tenths of the time you will be condemned for using poor judgment should you specify a steam or hot water heating system.

The heating requirements of residences, flats, schools, hotels, churches, etc., vary according to climatic conditions, size of building and number of rooms, style of architecture and nature of material used in construction.

Heating efficiency can only result from a thorough analysis of the proposition as applied to each individual building.

The requirements at all times are best fulfilled by specifying the Jahant Down Draft Furnace with the built-to-order heat distributing system.

The Jahant warm air system costs less and is easier to install than other systems. It requires little space and considering it from the standpoint of the user, is easiest to care for and delivers plenty of heat whenever and wherever desired at a saving of ¼ to ½ in fuel bills.

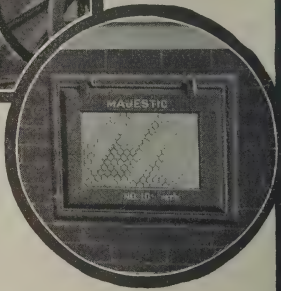
We guarantee the Jahant, make prompt deliveries and prepay all freight.

Our free illustrated book gives general specifications, descriptions and prices. It explains our co-operative policy of furnishing without cost to you, special blue prints and specifications to be submitted with your building plans and tells why it will pay you to specify the Jahant.

The Jahant Heating Co.
90 Mill Street, AKRON, O.
Furnace Builders for more than 30 years.

MAJESTIC FOUNDATION COAL CHUTE

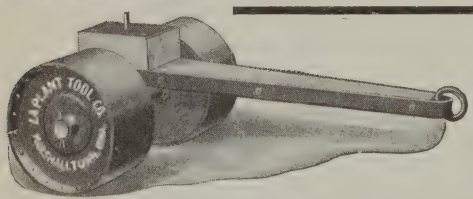
¶ Protects the building just where most needed—above the opening. ¶ The heavy steel hopper catches all the coal.



¶ When not in use, the hopper lies in the bottom of the chute body. ¶ The door locks automatically either open or closed. Strictly burglar-proof. ¶ With ¼ inch wire glass or steel panel in door.

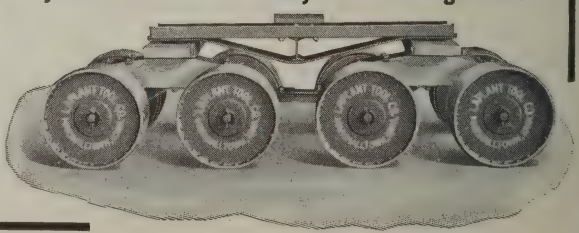
Write for circular and address of nearest dealer

Majestic Furnace Co.
70-74 Erie Street, Huntington, Indiana
Chicago Office: 1102 Monadnock Block



There is Big Money in Moving Old Buildings

If you use the La Plant Heavy House Moving Trucks

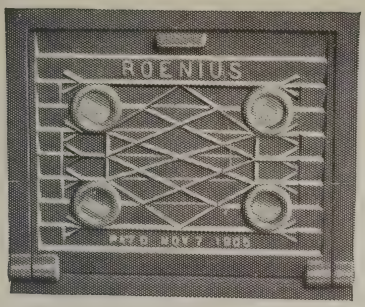


WRITE FOR CATALOG N

and see how easy it is to wheel a building a mile in a day—and how little the cost is for La Plant outfit compared with the profit to be made in moving houses instead of wrecking them. La Plant trucks are built on scientific lines—and are interchangeable so they can be worked singly, in pairs or in fours.

LA PLANT TOOL CO.
900 East Nevada St., Marshalltown, Iowa

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

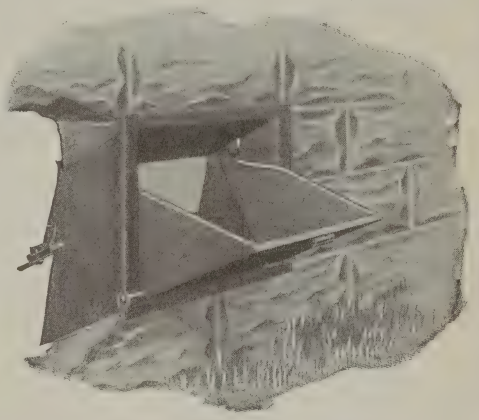


Roenius Wood and Coal CHUTES

Have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed.

Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked.

Roenius style B Chutes are made with glass discs—and this chute is used especially in cases where the only available light must pass through the coal chute.



Ask your dealer for the Roenius—and get the best.
Write for Circulars and Prices.

GRAND RAPIDS FOUNDRY COMPANY
MANUFACTURERS
Grand Rapids, WISCONSIN

BUY FROM THE MAKER

¶ We have made and sold thousands of steel furnaces in Chicago, and we have sold them everywhere, by mail, direct to contractors, builders, and house owners, all over the country, from Maine to China. We don't offer them through dealers, for the DIRECT DEAL with the consumer is the most satisfactory to all concerned. It means BETTER SERVICE—because of the direct interest of the maker in each contract—and it means BETTER PRICES, for the middlemen's profits are cut out.

¶ **In buying** the Hess Furnace, **you needn't have faith.** You can buy it now, on trial, and test it before January 1st, 1913. We will deliver it at your station, with all pipes and registers—freight prepaid.

¶ **Set it up and use it.** If you're not pleased; not sure you have big value for the price—send it back to us—we paying return charges—and we won't claim one cent from you.

¶ **We don't offer you credit, however,** for we require the price to be deposited with your local banker when you receive the goods. He holds it till the test is made, subject to the conditions outlined above, and gives it to you or to us, according to the result of the test. You take no risk, and you will save money.

¶ **Our furnace is made of steel,** EVERY SEAM WELDED, and therefore permanently gas—dust—and smoke—tight. Made in six sizes, and burns any fuel. There is no furnace better, at any price.

¶ **Our 48 page booklet on furnace heating is free. Ask for one. It will give you a lot of useful information on heating.**

HESS WARMING AND VENTILATING CO.
907 TACOMA BUILDING, CHICAGO
WE MAKE THOSE BEAUTIFUL WHITE STEEL MEDICINE CABINETS; CHEAPER THAN WOOD

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE AURORA CUPOLA-VENTILATORS FOR STABLE VENTILATION

offer greater ventilation capacity than the old fashioned wooden ventilator

AURORA CUPOLA-VENTILATORS are made of the best galvanized steel—have inside screens giving protection against birds entering—and are shipped "knocked down"—all ready to put in place by the most inexperienced person. WRITE US FOR CIRCULARS OR ASK YOUR DEALER to show you one. Specify Aurora Cupola-Ventilator on your next stable job. It cannot help but be satisfactory to all.

MESSENGER & PARKS MFG. CO.

Aurora, Illinois

"TITELOCK" METAL SHINGLES

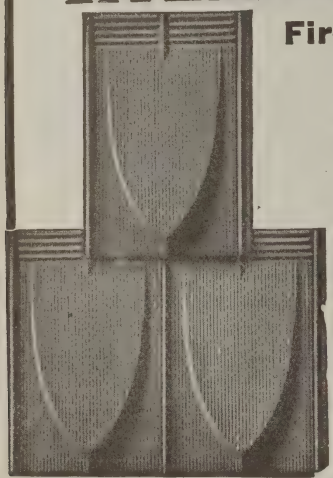
TRADE MARK

Fire, Water and Lightning Proof

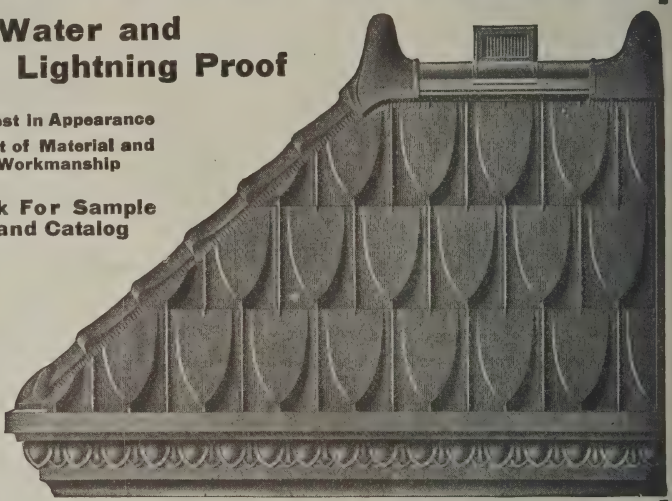
Finest In Appearance

Best of Material and Workmanship

Ask For Sample and Catalog



STYLE B. Showing Method of Laying.



STYLE B. Showing Ridge and Hip Finish.

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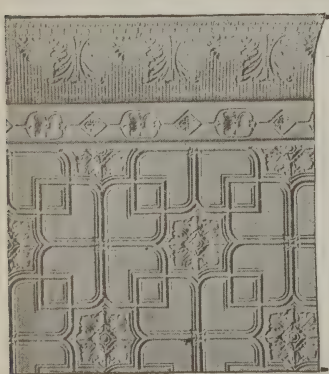

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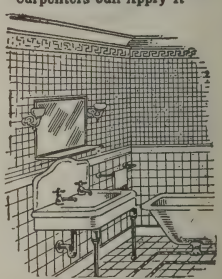

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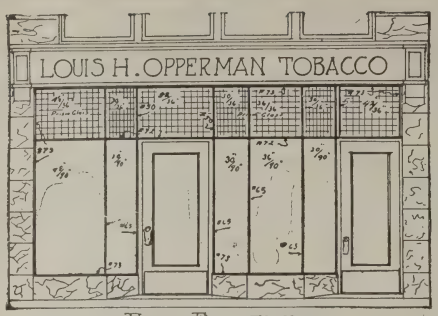

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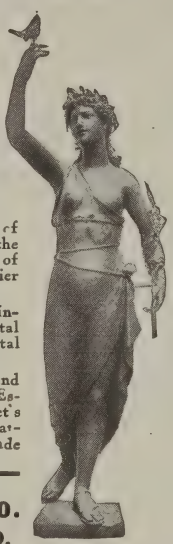

The W. H. Mullins Co.
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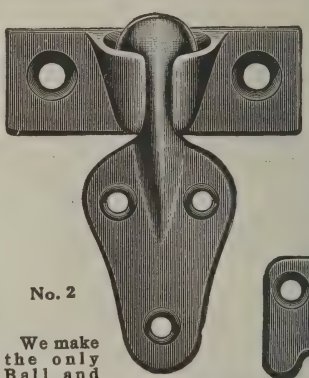
STORM SASH AND SCREEN HANGER Nos. 1 and 2



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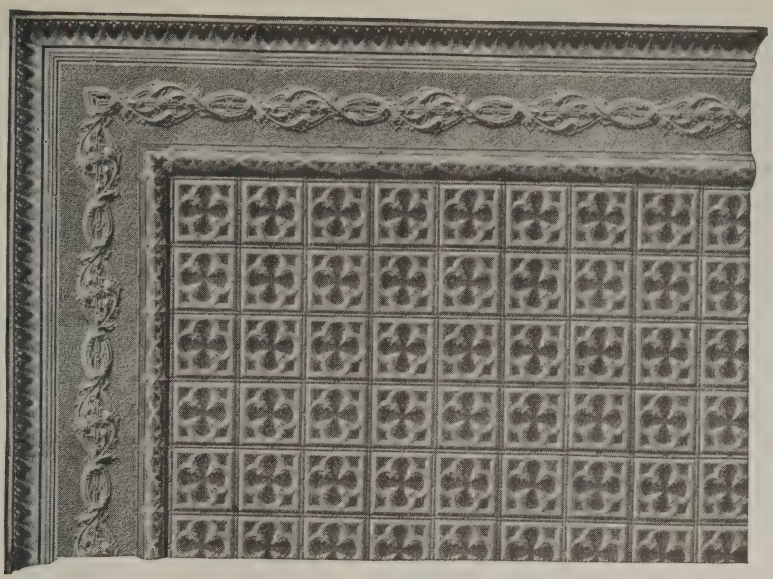

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SCRAPES BOTH WAYS

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"FOX"
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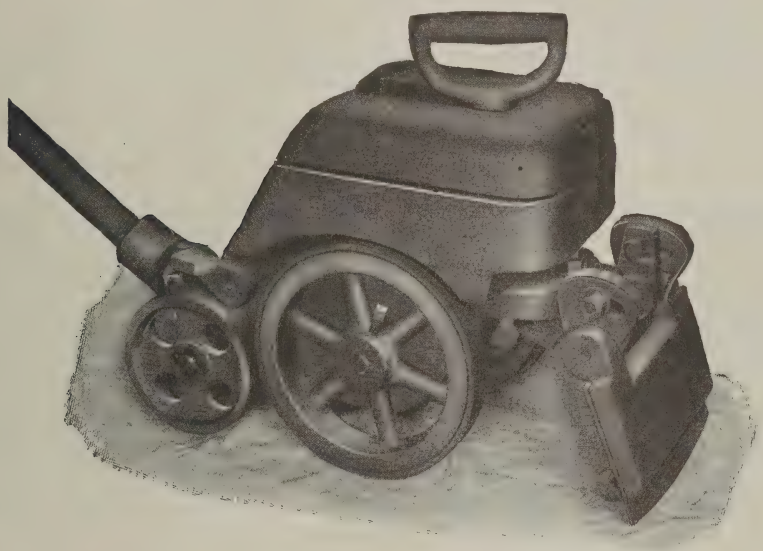

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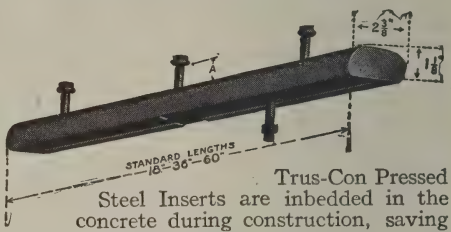

Trus-Con Pressed Steel Inserts are inbedded in the concrete during construction, saving expensive drilling after completion of the work. The long slots allow a wide variation in position. Special washers prevent bolts turning in the slots.

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Actual Size of Mesh

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Expanded Metal Lath

1. Is easy to handle.
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3. Is easy to shape for ornamental plaster work.
4. Is very rigid.
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The NATIONAL BUILDER

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THE NATIONAL BUILDER

Vol. 54 (48th Year) CHICAGO, DECEMBER, 1912. No. 8

NATIONAL BUILDER DESIGN NO. 361.
Arthur P. Coon, Architect, Scranton, Pa.

For Floor Plans, Details, etc., see Supplement of this number. Estimated cost, architect's fees not included, $4,068.20.

The Syracuse House

WITH the growth of wealth, and still more of leisure, the demand for comfort increases, more particularly among persons of refinement and education. Nowhere is this law of human life more in evidence than in what is familiarly known as "the home." Man begins with the "house necessary," passes on to the "house convenient," indulges for a time, perchance, in the "house ornate"; but if he be wise, he finally settles down to the "house comfortable"—the home, in the best and truest sense of the term.

Now, in a few words, we have the explanation of the modern country residence now so much in vogue in all the more settled communities, and the demand is a growing one.

We accompany this article with perspective view of a modern country residence, recently built in Western New York state. Albert C. Coon, Scranton, Pa., architect. Full plans and details are given in our Supplement.

The house is one that can be put up at a moderate cost. The building is attractive by reason of its very simplicity. Such effect as is produced is obtained by the simplest of means—broad flat surfaces; a pleasing grouping of windows; a porch-hood supported by brackets over the main entrance; a bay window by way of relief; and bold eaves make up the sum of what may be called the architectural features. Note the glazing to the top lights of windows, also the semi-circular headed door to main entrance. Unimportant details, no doubt, but effective, for it is little touches of this kind that impart character to a house and give it distinction.

The interior arrangement is fully shown in the plans. The hall, which is approached

through the entrance vestibule, is eight feet wide and extends the entire depth of the building. To the left is the wing room. This is a fine apartment lighted on three sides; a porch is added on the north end. It is provided with an open fireplace of special design, particulars of which will be found in the insert. A fitted bookcase is attached.

To the left is the dining room, with service pantry and kitchen in the rear. Communication between hall and dining room is by sliding doors. When these are fully open, living room, hall and dining room are thrown into one. The result is effective and is increased by the disposal of the windows.

On the second floor are four bedrooms and a bathroom. Ample cupboard space is provided on both floors. In the basement provision is made for laundry, boiler room, fruit cellar and coal cellars.

The exterior walls are of studding, covered externally with sheathing and metal lath secured to 7/8-inch furring and finished off with Portland cement stucco. The roof is of shingles.

The exterior stucco work and the shingles can be readily stained so as best to please the owner and bring the entire building into harmony with its surroundings.

Estimate of The Syracuse House

By I. P. HICKS.

EXCAVATING AND MASONRY.

214 yds. excavating, 35c	$ 74.90
1,800 cu. ft. concrete wall, 25c	450.00
17 lineal ft. chimney breast, $2.50	42.50
20 lineal ft. chimney above breast, $2	40.00
37 lineal ft. kitchen chimney, $1	37.00
300 yds. outside plaster, $1	300.00
Total excavating and masonry	$ 944.40

LUMBER BILL.

	Feet.
20, 2x6x12 ft. wall plates	240
20, 2x8x12 ft. wall plates	320
24, 2x10x16 ft. first floor joists	648
28, 2x10x10 ft. first floor joists	462
28, 2x10x16 ft. first floor joists	756
6, 2x10x12 ft. first floor joists	120
11, 2x8x16 ft. porch joists	231
42, 2x10x18 ft. second floor joists	1,260
28, 2x10x10 ft. second floor joists	462
10, 2x10x12 ft. second floor joists	200
72, 2x6x16 ft. ceiling joists	1,152
20, 2x6x12 ft. ceiling joists	240
140, 2x4x18 ft. partition studs	1,680
160, 2x4x18 ft. outside studs	1,920
56, 2x4x16 ft. plates	616
4, 2x6x20 ft. hip rafters	80
66, 2x6x16 ft. rafters	1,056
24, 2x6x12 ft. lookouts	288
15, 2x4x16 ft. bay and hood over door	165
8, 2x10x12 ft. cellar steps	160
15, 2x4x14 ft. collar beams	135
30, 1x6x12 ft. No. 1 com. braces	180
20, 1x4x12 ft. No. 1 com. bridging	80
30, 2x4x14 ft. basement partitions	270
Total ft. framing lumber	12,721

12,721 ft. framing lumber at $26	$ 330.74
3,500 ft. 8 in., No. 2 lap, rough floors and basement partitions, $26	91.00
2,800 ft. 1x8, No. 2 shtg., outside walls, $26	72.80
2,450 ft. 1x6, No. 2 shtg., roof, $26	63.70
24 M. Star A Star, R. C. shingles, $4	96.00
220 ft. 1x4x16 ft. flg., $45	9.90
1,040 ft. 5/8x4x12 to 16 ft. ceiling	36.40
Cornice planceer	35.00
500 lineal ft. 1x6 finish, $45	11.25
300 ft. 2¼ face flg., $45	148.50
Total lumber bill	$ 860.29

MILL WORK.

4 cellar window frames, 8x10, 3 lt., $1.75	$ 7.00
4 cellar sash, 8x10, 3 lt., $1	4.00
1 outside cellar door frame, 2 ft. 10 in. x 6 ft. 8 in.	2.25
1 outside cellar door frame, 2 ft. 6 in. x6 ft. 8 in.	2.25
3 inside cellar door frames, 2 ft. 10 in. x 6 ft. 6 in., $2	6.00
1 O. S. cellar door, 2 ft. 10 in. x 6 ft. 8 in.	3.50
1 O. S. cellar door, 2 ft. 10 in. x 6 ft. 8 in.	3.50
1 O. S. cellar door, 2 ft. 6 in. x 6 ft. 8 in.	3.25
3 inside cellar doors, 2 ft. 10 in. x 6 ft. 6 inches, $2	6.00

1 front door frame, 3 ft. x 7 ft....	3.00
1 vestibule door, 3 ft. x 7 ft., with side lights	10.00
1 double door frame, 2 ft. x 7 ft...	3.50
1 window frame, 3 ft. 6 in. x 5 ft. 2 in. over all	2.25
2 window frames, 2 ft. 6 in. x 5 ft. 2 in. over all, $2.25	4.50
7 window frames, 3 ft. 4 in. x 5 ft. 2 in. over all, $2.25	15.75
2 window frames, 2 ft. 6 in. x 4 ft. 2 in. over all, $2.25	4.50
1 window frame, $3 ft. x 4 ft. 2 in. over all	2.25
6 twin frames, 3 ft. 4 in. x 5 ft. 2 in. over all, $4.50.....	27.00
1 twin frame, 1 ft. 6 in. x 4 ft. over all	4.50
1 twin frame, 2 ft. x 4 ft. over all.	4.50
1 ice box door frame, 1 ft. 8 in. x 1 ft. 8 in.	2.00
1 window, 3 ft. 6 in. x 5 ft. 2 in. over all	2.50
2 windows, 2 ft. 6 in. x 5 ft. 2 in. over all, $2.25	4.50
19 windows, 3 ft. 4 in. x 5 ft. 2 in. over all, $2.50	47.50
2 windows, 2 ft. 6 in. x 4 ft. 2 in. over all, $2	4.00
1 window, 3 ft. x 4 ft. 2 in. over all	2.25
2 windows, 1 ft. 6 in. x 4 ft. over all, $1.80	3.60
2 windows, 2 ft. x 4 ft. over all, $1.90	3.80
1 set jambs, 6 ft. x 7 ft.	1.00
1 set sliding door jambs, 6 ft. x 7 ft.	2.00
8 set jambs, 2 ft. 8 in. x 7 ft., 80c.	6.40
5 set jambs, 2 ft. 6 in. x 7 ft., 80c.	4.00
2 set jambs, 2 ft. 4 in. x 7 ft., 70c.	1.40
2 doors, 2 ft. x 7 ft., $5.....	10.00
3 doors, 2 ft. 10 in. x 6 ft. 6 in. x 1⅜ in., basement, $2.25.....	6.75
1 door, 2 ft. 6 in. x 6 ft. 8 in. x 1¾ in. rear O. S.	3.50
1 door, 2 ft. 10 in. x 6 ft. 8 in. x 1¾, storage	3.75
1 door, 3 ft. x 7 ft. x 1¾ in., front dr.	12.00
1 door, 3 ft. x 7 ft. x 1¾ in. vestibule	12.00
2 side lights	6.00
8 doors, 2 ft. 8 in. x 7 ft. x 1⅜ in., $2.70	21.60
5 doors, 2 ft. 6 in. x 7 ft. x 1⅜ in., $2.60	13.00
2 doors, 2 ft. 4 in. x 7 ft. x 1⅜ in., $2.50	5.00
2 sliding doors, 3 ft. x 7 ft. x 1¾ in., $4	8.00
84 plinth blocks, 5c	4.20
84 casings, 6 ft. 4 in., for doors, 13c	10.92
44 casings, 5 ft. 4 in., for windows, 11c	4.84
14 casings, 4 ft. 4 in., for windows, 9c	1.26
284 ft. head casing, 3c	8.52
120 ft. window stool, 2c	2.40
120 ft. apron, 2c	2.40
406 ft. window stops, 14 ft., ½c.	2.03
210 ft. door stops, 16 ft., 1c.....	2.10
726 ft. base, 3c	21.78
726 ft. floor mold, ½c.....	3.63
420 ft. picture mold, 1½c.....	6.30
2 cupboards, 6 doors, each	36.00
1 cupboard, 4 doors	12.00
1 bookcase	15.00
Stairs	50.00
28 cornice brackets, 50c	14.00
270 ft. 3½ in. crown mold, 2c..	5.40
350 ft. 2 in. bed mold, 1c	3.50
80 ft. ⅞ cove mold, ½c	40
Total mill work	$509.23

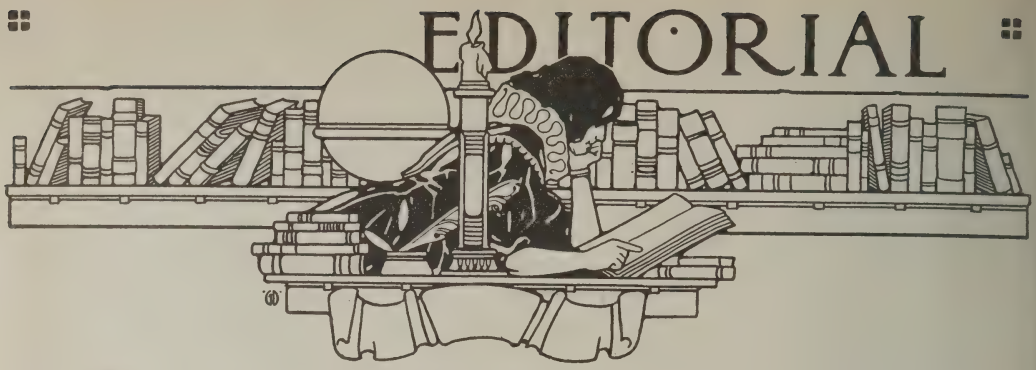
CARPENTER LABOR.

12,721 ft. framing lumber, at $10.$	127.21
8,750 ft. sheathing, $8	70.00
24 M shingles, $2.....	48.00
3,300 ft. 2¼ face flg., $20	66.00
25 squares smoothing, $1.50.....	37.50
2 squares porch floor, $1.50.....	3.00
Setting 36 frames, 25c.....	9.00
Fruit cellar, bins and shelves.....	5.00
Cellar stairs	6.00
260 lineal ft. cornice, $15	39.00
40% cost of mill work for finishing.	203.69
Total carpenter labor .....$	614.40

RECAPITULATION.

Excavating and masonry .....$	944.40
Lumber bill	860.29
Mill work	509.23
Carpenter labor	608.40
Hardware and nails	65.00
Tin Work (no gutters)	10.00
Plastering, 1,008 yds., 27c.....	272.16
Plumbing	280.00
Electric wiring	55.00
Painting	210.00
Mantel	60.00
Add for incidentals 5%.....	193.72
Total estimate .....$	4,068.20

EDITORIAL



CHRISTMAS AND NEW YEAR.

This is the season for good wishes, and renewed resolutions for good. We hope all our friends—big and little—male and female—may have a real Merry Christmas, and a most Happy New Year, and may the resolutions decided upon, be for the betterment of all concerned, and be faithfully adhered to. Such are the wishes and sentiments of THE NATIONAL BULIDER.

1913.

These are the figures that will be used often during the next twelve months.

Get your name on the subscription list early, so there will be no "break" in your file of papers. "Subs," are coming in pretty rapidly. Don't you be the last on the list.

It matters not how good a workman a man may be, if he does not have brains to guide his hands and his actions. Sooner or later he will be sure to come to grief on some matter, or trouble, he did not foresee. It is always better to consider every point, working it out in your own mind complete, before commencing on the actual work. This necessitates some brains. You have the brains, set them to work.

"To the making of building codes, there is no end." "T'were better if many of them had never been made." One of the main troubles in the making of codes, is that the men who mainly have the construction of them, are not usually the proper persons for the service. Politicians, municipal grafters, architects of doubtful ability, municipal engineers of more or less constructional knowledge, with a pettifogging lawyer or two thrown in, along with a glib talking "know-all" citizen, and perhaps a master builder, as a rule compose the personnel of the board, or committee to whose supposed wisdom the task of concocting and compiling the code is submitted. As a rule the builder and general contractor, and the foreman, or the man on the "job" is rarely found in such gatherings, yet it is a well known fact among veteran foremen and old workmen, that there are many points in construction, safe building, and fire protection, and a hundred and one other things, that the "high-brows" know nothing about, and though thought of not much importance, are essential in making a building as complete, as perfect, and as safe as our present knowledge of the building science can possibly admit. These remarks are called forth because of the receipt of a copy of a new "code" of building recently issued by the state of Illinois. This is, perhaps one of the very best "codes" we know of, but it has its defects and omissions, some of which might never have occurred if the man on the "job" as well as the theorist had been given an opportunity to express an unbiased opinion on the varied subjects.

Cleveland, Ohio, has issued a "code" for the guidance of architects and builders who erect structures in that city, and there are quite a number of complaints and considerable fault finding with some of its rules and conditions. It is said to be far from perfect, and so removed from common sense in some of its clauses, as to render it almost impossible to follow, and it may be that some radical changes, which seem essential, will

have to be made before it will be accepted as complete by the general public. Indeed, the difficulties encountered in devising and securing the adoption of equitable and wise building regulations for cities of considerable size and importance appear to be well nigh insuperable. New York City has been endeavoring to accomplish this feat for years, but if real progress has been made towards the much desired end, it is not generally known or in fact apparent outside of the various committees that have been engaged upon the work. It seems to us that the better way would be for all who are interested in these "codes," to have a convention consisting of delegates from every state, to meet at some central point, discuss the matter thoroughly, and construct a "code" taken from the various "codes"—city and state—making it uniform and suited to the requirements of the various sections of the country.

Another innovation is now pending in the building trades and we will soon see women specialists in all the building lines. It will be a sight to watch a woman—a lady—on a steel frame directing the work from the dizzy height of several hundred feet, while the woman builder, with her cohorts of feminine bricklayers, plasterers, carpenters and steamfitters, will have lost its novelty in the eyes of the public, for the new Johnson Trade School for women, named in honor of the fire commissioner, at Winfield, L. I., is now a fact.

This may seem an abrupt, and sudden departure from the customs and methods of ages, but it is coming, and it will not be long before we will be seeing women of all sorts and sizes, performing all kinds of work on a building, from excavating the cellar to topping off a chimney, or fastening a weather vane on a steeple. Rich and poor girls are to be taught alike, in a school which is to be opened at an early date, and which will have a guaranteed enrollment of pupils of 135. Ninety was the original limit of the school's capacity, but so many applications have come to the Master Builders' Association, which is backing the scheme, it has been decided to add two more stories to the original plan in order to accommodate 250. Otherwise the school would have been opened October 15. The plan met with instant approval of women, for after the first announcement of the project being started in September, the board of trustees was literally swamped with applications for admittance. The requests came from girls in every walk of life. Some of the letters are from girls of poor families; others from the daughters of rich parents, the father of one being a St. Louis millionaire and another a United States senator. The school building which is being fully equipped with all necessary appliances, is situated near Winfield station, and is just fifteen minutes from New York City.

Francis X. Grady, vice-president of the Master Builders' Association is one of the most enthusiastic over the project. He believes that women will not only qualify in the building trade but they will, he avers, get better wages than they can hope to get in any other occupation.

A bill has been introduced in the Cuban Senate forbidding the letting of contracts for either national or municipal work except to contractors who are citizens of that country. The bill is the outcome of the recent collection of the claim of an American firm against the government for $557,000, representing the final settlement of the Cienfuegos waterworks contract. The bill also provides that in case any foreigners are apparently subcontractors interested in such contracts they shall be compelled to sign an agreement renouncing all right to the protection of the diplomatic representatives of their country.

IN MEMORY.

By the death of Frederick J. Drake, which took place at his residence, on the 28th or October, 1912, the technical publishing work loses an able and energetic member. Mr. Drake was the head of the publishing house of Frederick J. Drake & Company, 1325 Michigan avenue, Chicago, Ill., and was well known to the Building Trades, as the publisher of the technical works of Fred T. Hodgson. He was a good all-around fellow, and his early death will be deplored by all who knew him.

Covering Turret and Domical Roofs

By JOHN Y. DUNLOP

THE art of covering those special roofs is in fact a stage in our work in which drawing is interwoven with the use of tools and the fact that attention is called to what is general methods of drawings put our work on the same footing as the work of any industrial establishment.

To some the trade of a carpenter lies in being able to lay a floor, to make a panel door, to build a cornice, to shingle a roof, to construct a picket fence, to frame a barn, and to cut rafters for a hip roof; but he must do more to be an up to date carpenter.

He must have a knowledge of the fundamental principles of drawing which along with the processes of construction fit him for speedy leadership among the old style uneducated mechanics.

SQUARE TURRET.

Figure 3 and Figure 2 show the plan and elevation of this feature.

This is amongst one of the simplest turrets and the development of the side is made by drawing the eave line as the base of a triangle and then drawing around it the triangles forming the inclined side (hip rafters).

In practice there is no difficulty in covering a roof of the type, the boarding being laid horizontal are cut in succession until the apex is reached.

Figure 1 shows the section of a concave square turret and Figure 4 the section of a convex (domical) square turret, each of those being covered as suggested in the previous question.

CONICAL TURRET.

In a roof of this kind the covering runs from the eaves to the apex; that is, with the points of the board included between two planes meeting along the axis.

The boards are therefore tapered and are straight on the points.

CONCAVE TURRET ROOF.

Figure 5 and Figure 6 show a roof of this pattern, Figure 5 giving the plan of the boarding.

The points of the boards are similar to the last example but owing to the roof being of a double curvature the boarding should be cut to a special pattern.

Divide the side of the roof into any number of equal parts and project on to the plan.

Develop the center line of the roof board as a right line and mark off the division adopted. Referring to the plan make line 1 on the true shape equal line 1 on the plan—2 equal 2—3 equal 3 and so on to the last division.

Trace a line through the point obtained and the enclosed figure is the true shape of the board.

GOTHIC TURRET.

Figures 7 and 8 show the plan and elevation of this roof, which is generally constructed with a series of vertical ribs and purlin pieces.

Figure 7 shows the plan of the turret boarding with the true shape of one board marked off.

OGEE TURRETS.

In this example the surface of the solid of a double curvature, Figure 9, shows the plan, and Figure 10 the elevation, each having the points of the covering marked in position.

Figure 2 also show the true shape of the turret boarding.

Divide the side of the turret into any number of parts.

Project on to the plan of one board and proceed to develop the center line of the plank.

Mark off the divisions obtained from Figure 10 and make the line 1 equal to the line 1 on plan, 2 equal 2 and so on to the last division.

A line drawn through the points obtained gives the true shape of the template.

DOMES.

Usually when part of a sphere is covered with a great number of boards the figure is considered as a polyhedron and the boards when in position are parts of cylinders cut into gores forming flat sides which diminish in width.

The photo of the dome shown is, however, boarded from the hexgonalal base to the crown, ordinary match boarding being used.

Figure 11 shows the points of boarding on an ellipsoidal dome, the boards being in gores the pattern is obtained as described for Figure 9.

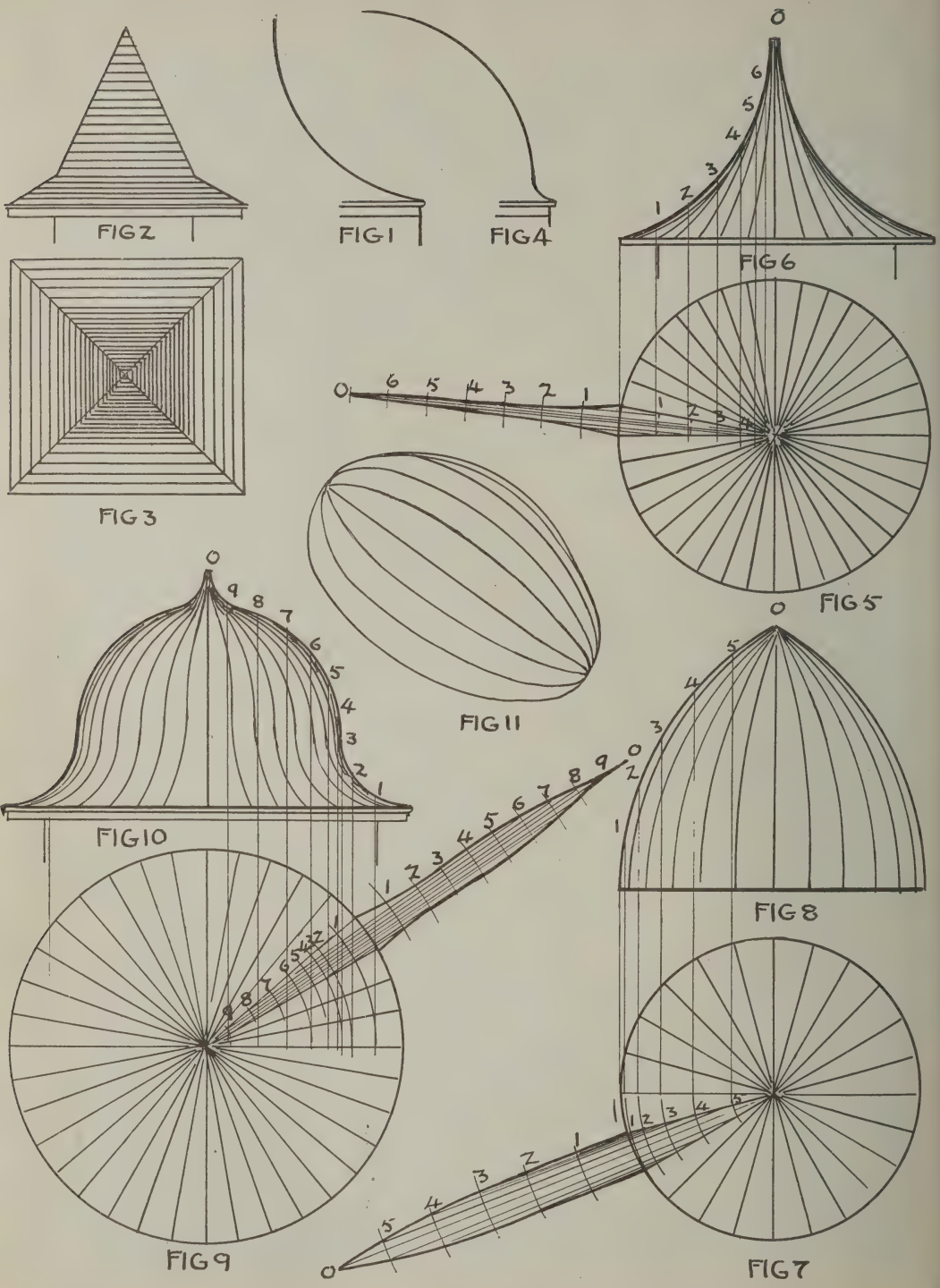


FIG 2
FIG 1
FIG 4
FIG 6
FIG 3
FIG 5
FIG 11
FIG 10
FIG 8
FIG 9
FIG 7

Heating of The Modern Home*

By CHARLES F. SMITH, Consulting Engineer

BUT very little data has been published regarding heating by furnace; for that reason, and also because that method of heating is very frequently employed in the home, and the installation usually made on the "hit or miss" principle (that is, if the system heats satisfactorily, the owner is in luck, and if it does not, he has an opportunity to put in another furnace or some other method of heating), considerable attention is devoted to that method of heating and the correct formulas for its proper installation in this series of articles. The discussion, however, is made as brief as clearness will permit, and much of the data furnished applies also to any other system of heating at present in use.

No hot-air pipe, nor smoke flue should be located near exposed wood work; the smoke flue should not be less than twelve inches from exposed wood work, nor nearer than eight inches from protected wood work. All exposed woodwork adjacent to smoke flues or horizontal hot-air pipes should be protected with one-quarter inch sheet asbestos covered with sheet tin, or galvanized-iron, and the space around the vertical flues should be lined in the same manner, or double pipes used, having not less than one inch dead air space between them. This is really a very serious matter, deserving of the closest attention; fire frequently occurs at night from overworked heating apparatus with resulting loss of life. Let prevention, rather than cure, be our motto.

Each room on the first floor must be supplied with hot-air through a separate pipe; the rooms on the upper floors should also be so supplied, although two comparatively small adjoining rooms on the same floor, are often supplied from the same pipe, but when so arranged, the registers should be set off so as not to come directly opposite each other. It occasionally is found desirable to supply a room on the third floor from the same flue leading to a room on the second floor directly beneath it. When this is done, care must be taken to restrict the area of the branch leading to the third floor, otherwise the higher velocity of the air, due to the greater height of the third floor flue will leave the second floor room with much less air than was intended. The flow of air in a flue with furnace heating, or with indirect radiation, is due entirely to the difference in weight between the column of air inside the flue and a column of equal height of colder air outside, and therefore varies with the temperature of air and height of flue, that is, an increase in temperature and same height, or the same temperature and greater height will increase the velocity.

It has been found in practice that owing to losses by friction, bends, slight reductions in temperature, etc., that the theoretical velocity is about 50 per cent too high for practical use. In table No. 5 is given the actual velocities which may be expected in flues of different heights with varying differences of temperature between the air inside the flue and the outer atmosphere. It is necessary to know these velocities in order that we may calculate the size of flues required for the different rooms.

With the average temperature of 120 degrees within the pipes and flues, and the usual heights from the furnace to the first floor register of five feet to the second floor fifteen feet and the third floor twenty-five feet we find from the table that we may expect velocities per minute of 264, 456 and 588 feet respectively; for additional surety and simplicity of further calculations, it is well to omit the odd feet in the results, thus making the velocities 260, 450 and 580 feet. When we know the volume of air required in cubic feet per minute, we need only divide it by the velocity to learn the area in square feet of the pipes and flues.

When making our calculations for heating by furnace or indirect radiation we must bear in mind that it is necessary to first heat the fresh incoming air to the desired room temperature, usually 70 degrees, and must also provide additional heat to make up the losses by leakage and conduction through the walls, doors and windows. Having already used 70/120 for air heating, we have left only 50/120 for actual room heating; we find from table No. 3 that each cubic foot of air raised in temperature from

*This series on Heating of the Modern Home began in the September number.

zero to 120 degrees contains 2.46 b.t.u's, therefore 50/120 multiplied by 2.46 gives us practically 1 b.t.u. per cubic foot of air for heating purposes, consequently we will require as many cubic feet of air per hour, heated to 120 degrees as we need heat units

Table #6-Hot-air Pipes and Registers			
Dia'-inches	Area Sq'-in	Area Sq'-ft	Registers
6	28	.196	6"×10"
7	38	.267	7"×10"
8	50	.349	8"×12"
9	64	.442	9"×14"
10	79	.545	10"×15"
11	95	.660	11"×16"
12	113	.785	12"×18"
13	133	.922	14"×20"
14	154	1.07	14"×22
15	177	1.23	16"×22"
16	201	1.40	16"×24

for each room. Remember that we have previously figured the air required in cubic feet per minute, and the heat units per hour, we have now brought both to the same time interval of per hour.

Having determined the area in square feet of the hot-air pipes, by dividing the volume required in cubic feet per minute, by the velocity of the air as given in table No. 5 of the previous article, we must determine the area of register required. When heating the home by a furnace, the registers are usually placed in the floor, or in the side walls just above; in these positions it is not advisable to admit the air at a higher velocity than three hundred feet per minute, because of objectionable drafts; this velocity then, divided into the volume to be admitted, will give the effective area in square feet of the register, but the effective area is less than the apparent area by from 33% to 50%, depending upon the design of the face.

It is the practice, quite generally in furnace heating to make the width or height of register equal to the depth of the pipe, and the length about 50% greater than the width of the pipe, that is, a 6" by 8" pipe would have a 6" by 12" register; that plan usually works out quite well for the lower floors, where the air velocity is not likely to exceed 300 feet per minute, but where the depth of flue does not exceed 3½ or 4 inches, the register, if installed according to that rule, would be too narrow to be of use. No register should be installed less than 6 by 6 inches. The vent flues and registers should be three-fourths the area of the supplies.

The flues should always be installed in the inner walls or partitions, in order that the air shall not be chilled in transmission; this applies to both supply and vent flues.

The location of the registers, whether above or below, depends entirely upon conditions. In large buildings such as theaters, public halls, schools, etc., where the air is nearly always moved by fans of large power, the conditions are altogether different than in the home, where we must depend entirely upon natural draft, or gravity for the air circulation. The vitiated air, being warmer and lighter, naturally rises above the cooler and purer air currents near the floor, and can only be diverted from its natural course by force. Any one doubting this statement may easily test it to their satisfaction by mounting a step-ladder in a lighted and heated room with a 10 or 12-foot ceiling. The difference in temperature between the floor and ceiling is too apparent to require a delicate thermometer for the test. In the home, therefore, the supply registers should always be placed in, or near the floor, and the vent registers in, or near the ceiling, about a foot below the ceiling is usual. It is always advisable to have one hot-air register in the floor near the front door, in order that the feet may be warmed when entering the house, but the hot-air pipe supplying this register should be provided with a sliding clean-out door in the bottom for the removal of the dirt and litter which is sure to pass through the register and become a fire hazard. The supply registers in the rooms should be placed near one end of the side wall, and the vent register near the other end of the same wall to secure the best circulation. There is sufficient velocity in the hot air in furnace heating to carry well across the average width of room in the home, and with the two registers placed at opposite ends of the room, but not on opposite walls, a good diffusion of fresh air is assured.

The vent flues should extend to the attic space just under the roof, and there collected together into one duct, or two if the house is a long one, discharge through a ventilator, or brick flue alongside the chimney.

To illustrate the working of our formula as applied to furnace heating, we will make the calculations for a modern home in New York, the equipment for which was designed by the writer about a year ago. The house is two stories with cellar and attic, of good frame construction, clapboards with paper lining, lathed and plastered. It faces north; is 22 feet front by 51 feet 6 inches deep. On the first floor is a living room 14 feet 6 inches by 20 feet 6 inches, with vestibule front door, and a bay window at each side. Back of the living room is a dining room on the west side, 12 feet 6 inches by 15 feet 6 inches, and on the east side a music room 11 feet by 7 feet 6 inches. Back of these is a pantry and stairway 5 feet 6 inches, and at the rear a kitchen 13 feet 6 inches by 16 feet 6 inches. The ceiling is 10 feet high. On the second floor, front, is a chamber 15 feet by 13 feet; back of this on the west is a chamber 10 feet by 8 and on the east a chamber 9 by 10 feet with a passageway between. Back of these is a bath room 5 feet 6 inches by 6 feet and a chamber 9 by 8 feet. The ceiling is 8 feet 6 inches. The lowest outside temperature is zero, the desired inside temperature 70 degrees. The schedule is given below.

When making the calculations for the B. t.u.'s required for the cubic contents according to the formula, we must use the factor given in table No. 3 for the lowest outside temperature to the desired room temperature, in this case, zero to 70°=1.43.

It may be noticed that although we ask for only one air change per hour in the schedule, the amount of air required for heating is greatly in excess of that requirement; the living room for instance would require but 50 cu. ft. per minute to effect one air change per hour, whereas, the heating requirements oblige us to furnish 480 cu. ft. per minute, or nearly 10 changes per hour, which insures a purer atmosphere in the room and greater comfort.

Table No. 6 gives diameters and areas of hot-air pipes, and sizes of registers generally used with them.

To many these calculations may seem a waste of time and effort, but there are always two ways of doing anything—a right way and a wrong way—and when we are providing for a permanent and necessary equipment, such as the heating system in our home, it is certainly far better to expend a little more time and intelligent effort in the proper design, than to install it on the "guess" plan and have all the family suffering from colds, bronchitis, pneumonia and kindred ills during the entire winter. Above all, do not be persuaded by the slight difference in cost to install a furnace too small for the work—a very common trouble.

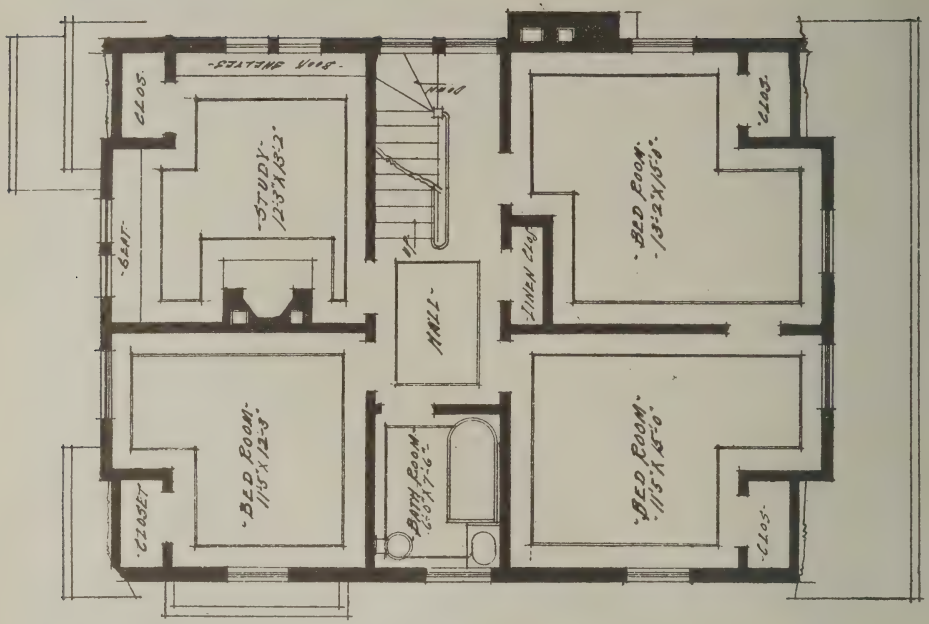
In our next issue, we will take up heating by steam and hot water.

Schedule for Furnace Heating

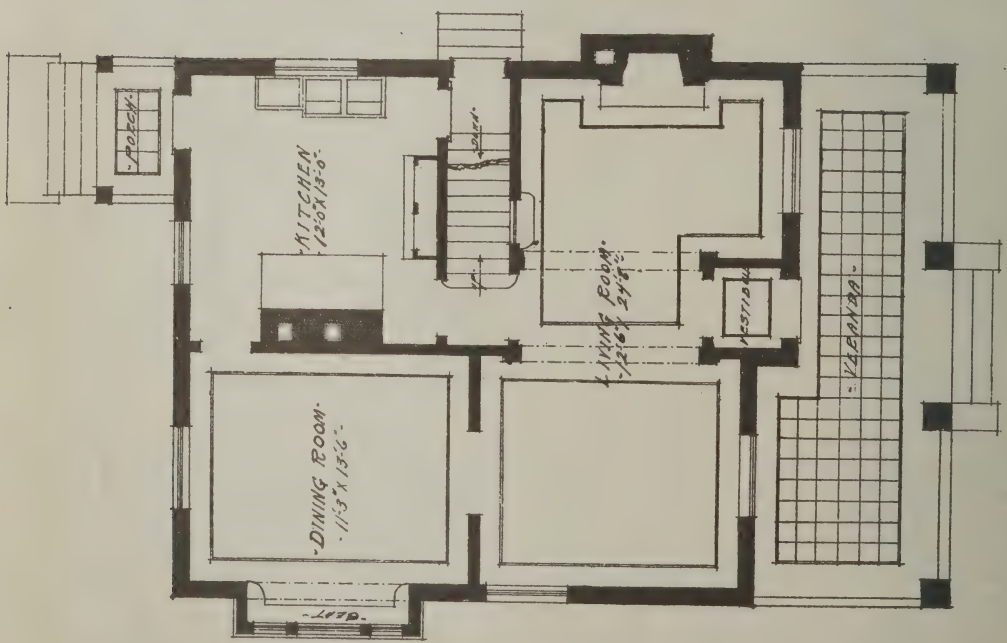
Room Name or N°	Size	Exposure	Air Changes	Glass Surf' Sq.ft	Wall Surf' Sq.ft	Cubic Cont'ts	Floor Area	Ceil'g Area	B.t.u.s for Glass Table 2	Wall Table 1	Cu.Cont Table 3	Floor Table 4	Ceil'g Table 4	Total	% Added Exp	Am't Added	Total B.t.u.s per hr	Air required cu.ft per m'	Size of H.A.Pipe Table 5	Size of Reg'	Size Vent Flue	Size Vent Reg'
Living	14'6"×20'6"	N	1	127	398	3000	300	—	9650	7960	4200	3270	—	25080	15	3760	28842	480	2-13"	2-10×2	Fire	Place
Dining	12'6"×15'6"	W	1	63	132	1938	194	—	4788	2640	2770	1513	—	11711	10	1171	12882	214	12"	10×18	Fire	Place
Music	11'0"×7'6"	E	1	25	85	825	82	—	1900	1700	1180	894	—	5674	10	567	6240	104	9"	10×12	6×8	6×12
Kitchen	13'6"×16'6"	S	1	69	311	2230	223	—	5241	6220	3190	2431	—	17085	0	—	17085	284	12"	12×18	—	—
Second floor																						
1	15'0"×13'4"	N	1	81	285	1658	—	195	6156	5700	2370	—	1520	15746	15	2362	18108	302	8×12	10×16	6×12	8×16
2	10'4"×8'4"	W	1	27	143	680	—	80	2052	2860	972	—	604	6488	10	649	7137	120	4×9	7×10	4×7	6×8
3	9'4"×10'4"	E	1	24	53	765	—	90	1824	1060	1094	—	702	4680	10	468	5148	86	4×7	6×10	4×6	6×8
Bath	5'6"×6'4"	W	1	24	44	280	—	33	1824	880	400	—	258	3362	10	336	3698	62		6×6	4×4	6×6
4	9'4"×8'4"	S	1	24	197	613	—	72	1824	3940	877	—	562	7203	0	—	7203	120	4×13	7×10	4×7	6×8

Total B.t.u.s for Building 106343 ÷ 42000 = 2.34 = Grate area

One Cast-Iron Indirect-draft Furnace-22" Dia. Grate



SECOND FLOOR PLAN.



FIRST FLOOR PLAN.

A Fireproof House at Spuyton Duyvil, N. Y. Robert W. Gardner, Arch.

The Fireproof Cottage

By JAMES CASEY

IN putting up a building of any kind, the builder, more particularly if he be at the same time the owner, has to figure upon something more than the bare first cost. The matters of durability, repairs and upkeep are not merely important, but vital. In other words, the building has to be considered closely as a whole, and from the viewpoint of the substantial investor, always assuming, of course, that the builder himself is of that order, and not merely a spectator without regard to the interests of the first gullible purchaser that chances along. In the long run, sound construction pays best, and this remark applies more particularly to the older and more settled communities, where all matters of investments, including those in house property, are best understood and more largely practiced.

Some such consideration as the above has doubtless had much to do with the improved methods of construction now in evidence, more or less, all over the country. House owners, as well as house occupiers, at least many and perhaps the best of them, are today asking for something more than the mere extent of the accommodation provided. They demand not only the conveniences to which they are accustomed, but those other and more permanent features that really enter into the idea of a true and restful home. Such, for example, as security against fire, and some provision against the transmission of disturbing noises, also against the spread of insect pests—in other words, something better than the familiar studded partition with which we all of us have been so long acquainted, as a sound transmitter and haven for vermin.

The cuts presented herewith show a detached double-fronted cottage residence recently put up at Spuytenduyvil, a suburb within the corporate limits of New York City, Robert W. Gardner being the architect. It is but one of a number of like residences going up in the same neighborhood—the

whole constituting an important subdivision improvement.

The cottage now under construction is a good sample of its kind. The elevation is of the inviting, cosy, domestic order. The entire arrangement, both outside and inside, simple and economical. Owing to the way in which the roof extends over the veranda, the house appears to be smaller than what it really is. From the architectural viewpoint, this is all to the good. As will be seen from the gabled return, shown in perspective, the building is a two-story, basement and attic affair. Approached from the front, however, the general impression conveyed is that of an unpretentious two-story or a one-and-one-half story cottage.

The interior arrangement is, in its way, equally effective and simple. The entrance is in the center, access being obtained through a small square vestibule which opens directly upon the living room. This is a fine apartment extending across the entire width of the building. In the rear are the dining room and kitchen, the former being set off with a square bay window, provided with a seat.

The staircase and interior hallway are stowed away quite neatly and deftly in a central position. Indeed, the entire problem of how to get from one part of the building to the other parts has been worked out in an exceedingly clever manner, all the more clever, in fact, for being so obvious and direct.

The entrances from outdoors are no less than three in number. The entrance for visitors is, as already stated, in front. Three Portland cement steps lands us upon a pleasant tile-paved veranda, and we have arrived. The tradesmen's entrance is in the rear, by way of the porch butting out from the kitchen. Finally, there is the door that gives access from the garden to the basement. This device is extremely simple, also extremely happy, as it keeps the more grubby and sordid side of domestic economy, such as stocking, chores, etc., well away from the other and more important, or rather more reposeful, parts of the house.

The following points should be noted, as they all have their value in their respective ways. Note the concrete beams in ceiling of living room. Beyond their structural use, these beams serve to indicate the passageway between main entrance and the interior hall. Note the wellhole to staircase and how it has been secured—it aids both the ventilation and the lighting.

On the second floor there are three bedrooms and a study. All the rooms are entered directly from the upper hall, as also is the bathroom. If preferred, the study could be used as a bedroom. All the rooms are rectangular and of excellent dimensions, and provided with good closets. For the hall, there is a linen closet, which is always a useful adjunct to any house.

The living room upon the first floor and the study upon the second floor are provided with open fireplaces. The house itself is warmed throughout by steam heat, for which provision is made in the basement.

It may, perhaps, be of some benefit to the young and inexperienced builder if we here direct attention to another feature of the building under observation. We refer to the way in which the second floor projects forward over the first floor plan, so as to utilize a part of the covered space over the veranda.

The exterior walls are finished off in rough cast. The coping to roof and the chimney cap are of terra cotta. This combination of solidity at the base and of color at the top is true at once to nature and to art. As such, it merits a parting word of commendation. Indeed, the entire conception and execution is commendable, and in this article we have sought to explain why.

The Colorist tells of a man who did not consider it was worth while to hire a professional to do so simple a thing as varnish a floor. He bought a brush and a can of varnish, which he took home with him at night on his way from work, with the intention of applying it that evening. Some hours later he called his wife to witness the artistic triumph. "How does it look?" he asked. "Fine," she replied, sniffing the air, "Fine! And such a novel idea. How did you happen to think of it'" "Wh—What-What's that?" he asked. "Why didn't you use varnish?" "Why—what—I did use varnish." "Oh, no," said his wife, "you got hold of the wrong can. You've been using maple syrup instead of varnish." And he had.

Painting Plastered Walls

By ASHMUN KELLY.

IT is never safe to apply oil paint over freshly plastered walls, on account of the free lime, which will act upon the oil of the paint as alkali acts upon fat, producing a soap. Three years would not be too long to let the wall dry out, and at least one year should elapse. In process of time the air will neutralize the lime, after which the wall may be sized and safely painted. An English expert, Fourniss, advises sizing new plaster walls, for painting, with a size made from a gill of hydrochloric acid to a pail of water. The acid will neutralize the free lime and form hydrochloric acid gas, which evaporates, leaving on the surface of the plaster sodium hydrogen sulphate, which may easily be removed by washing off with clear water.

All suction of the plaster must be stopped before applying the final coats of paint, and while many painters use a glue size for this purpose, it is not safe, owing to the possibility of dampness, which would loosen the glue and take off the paint. The very best method to pursue is to apply a paint made of pure white lead, raw linseed oil, and a very little turpentine, to assist penetration. Very little driers should be used on the priming coat, as driers tend to prevent sinking in of the paint, which should be made quite thin for the first coat.

It is well to tint this first coat to agree with the finish color, the same color but a very much lighter shade. For the priming mix about five pounds of lead to the gallon of oil. Brush the paint well into the wall. If in cold weather, warm the paint a little. Right here comes a point where the doctors differ. Many apply a coat of white glue size over the priming coat of oil paint, to stop any remaining suction, saying that no dampness can affect the glue when placed thus between two coats of paint; but this is not exactly true, for dampness will penetrate oil paint. Many, therefore, prefer to omit the glue size, which is used because cheaper than paint, and apply another coat of priming, a little heavier than the first or priming coat. Where a strictly first-class job is desired there can be no doubt of the superiority of the all-paint coating over the glue size method. However, saying we do choose the glue method, then make up the size with a pound of best white glue to the gallon of water, and apply it warm as possible. When the glue size has become perfectly dry apply a coat of oil paint, one that will dry with a gloss. Mix it rather heavy, and brush it out well. The lead may be thinned with a mixture consisting of three-fourths of raw linseed oil and one-fourth of turpentine. Driers to suit.

If the finish is to be flat, mix the next coat of paint of white lead, thinning with turpentine, no oil, of a consistency that will allow of easy spreading, yet good covering. But if the weather is hot, then add a trifle of raw linsed oil, which will make the paint spread more readily. If the finish is to be an egg-shell gloss, thin the last coat with one part raw oil and three parts turpentine.

An expert gives the following method for doing a strictly first-class job of wall painting: First, size the plaster walls with good glue size, and when dry, apply a glue size that will take strong muslin, smoothing out the muslin to form the ground for the painting. When perfectly dry apply a coat of white lead and oil, with enough japan to dry it, this coat being rather thin. Follow with two coats of lead, oil and turpentine, with about one-third turpentine. Allow each coat to dry well, say 24 hours, or even more than this, depending upon conditions. The fourth and final coat is made up of white lead thinned with turpentine only. Add a little japan driers. Stipple the last coat, and some think it an improvement to stipple the preceding coat also. Stippling does away with unsightly brush-marks, and gives a very pleasing effect. If a clear white finish is desired, use zinc for the last coat, instead of white lead.

The advantage of this method lies in the use of muslin, which will avoid any plaster cracks, making a solid job.

To paint a pure white job on plaster is not easy, yet it can be done after the following method: Take some zinc white ground in oil and mix it with benzine, beating it to a paste; set it aside until the oil and

benzine rise to the top of the paint, then pour off the liquid, and mix the zinc with turpentine, adding a little clear copal varnish to serve as a binder. For the second coat wash the zinc white twice with benzine, then thin up with turpentine only.

Zinc oxide ground in oil will turn yellow the same as white lead does, for it is not the pigment in either case that yellows, but the oil. By drawing off the oil as directed the white effect is rendered more permanent. For driers use with japan driers.

Some painters say that the addition of some water to the flat paint will render the flat or dead effect on the wall much better; it is said that the water in no wise injures the paint, as it all evaporates. The water should be well stirred into the paint, and it is best to add the water to the white lead just as it comes from the keg, before you have added any thinners. To effect his mixture successfully, add the water very slowly, beating vigorously meantime. There is a paint mixing machine for shop use, now on the market, that is ideal for this purpose, and costs but little.

On some plaster walls a good priming paint is made from equal parts of red and white lead, made quite thin with boiled oil. It should be well rubbed in, a suggestion that applies equally well to all primers on plaster or other walls. Some prefer to use boiled oil for every coat in such painting, from priming to finish, unless the last coat must be flat.

Once the wall has been properly painted, almost any kind of finish may be adopted with success. Painted walls are ideal for either calcimining on or for papering over, and certainly make the finest of all wall finishes.

Italian Inlay

WE referred at considerable length recently to Jacobean inlay, says Cabinet-Making, comparing its crudity with the elaborate examples which were executed in Renaissance times in Italy. By way of driving home that comparison, we illustrate some continental examples. Fig. 1 is a panel from the church of Santa Maria, Verona, and was executed about the end of the 15th century, while the craftsmen in this country

Fig. 1—From a Church in Verona.

were still busily engaged in carving Gothic poppyheads, rosettes, and gargoyles. The geometric design of mosaic in wood (Fig. 2) is also a piece of Italian work, and from these and similar examples the English cabinet makers of the Elizabethan and Jacobean periods got their inspiration for the

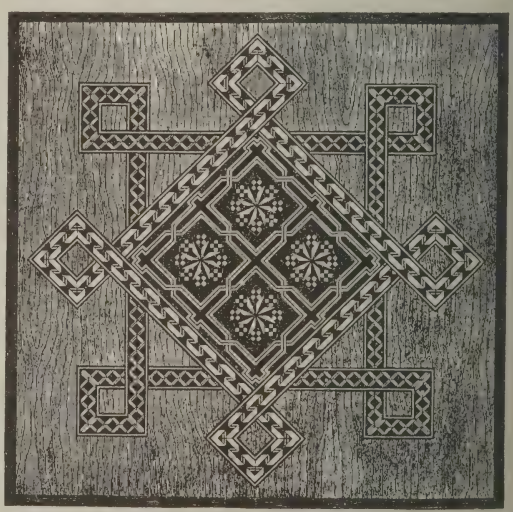


Fig. 2—A Geometric Motif.

"chequer" inlay, as it is called, which was such a feature of those styles. Examine this Italian example closely, and notice what a vast difference there is between the compli-

cated ribbon-like ornament and the crude black and white zigzag or chequer of early Renaissance times in this country. Fig. 3 is a piece of pure German Renaissance work, an example taken from the choir stalls in St. Katherine's Church, Kremnitz. Here the ornament is in a light wood on a dark background, and the next panel consists of a white background with the ornament appearing in black. Vasari, the Italian, speaks somewhat contemptuously of inlay, which he says was practiced chiefly by those persons who possessed more patience than skill in design. In his opinion, perspective representations of buildings full of windows and angular lines, to which force and relief are given by means of lights and shades, were the subjects most suitable for inlaid work. He admits that some of the representations of figures, fruits and animals were good; yet he added that the work soon became dark, and was in danger of perishing from the worms or by fires. From him we learn also that marqueterie, when first introduced into Italy, was done in black and white alone, after the manner of Fig. 3, and that to Fra Giovanni da Verona is attributed the art of staining the wood with various colors by means of liquors and tints boiled with penetrating oil in order to produce light and shadow.

Fig. 3—Renaissance Work.

City Planning

Some time ago we made some remarks on city planning and since then we have had several communications on the question, making inquiries of various kinds on the subject. The following communication, which has been sent us by Mr. Flavel Shurtleff, Secretary of the Conference, 19 Congress street, Boston, Mass. This will in a great measure give all information asked of us, and offer opportunities for obtaining further knowledge as may be desired:

The undersigned committee, appointed at the Fourth Annual Conference on City Planning, to prepare an outline for a study in city planning, submits the following statement for the information of members of the Conference:

The purpose of this study is not that of an ordinary competition, undertaken as a means of selecting and premiating that one among the designs submitted which, upon the whole, after offsetting its merits against its defects, presents the most praiseworthy solution of the particular problem in question. It is rather a means of securing the co-operation of a number of people in preparing and assembling specific and concrete illustrations of the application, under a given set of normal conditions, of a variety of important ideas and principles and devices used in city planning, in a manner which will facilitate a close comparison of their respective advantages and limitations.

It is expected that two or more members of the conference will collaborate in some cases upon a single plan. A single member may submit more than one plan or take part in more than one group submitting plans. Authors of different plans may consult with each other concerning their re-

spective plans while in progress if they see fit to do so. It will be left to those submitting the plans to determine when such consultation amounts to joint authorship deserving recognition in the title of the drawings.

Participation in the proposed study is open only to members of the Conference, but anyone may become a member upon applying to the Secretary, Flavel Shurtleff, 19 Congress street, Boston, and paying the membership fee of five dollars. In addition to the membership fee each entrant will pay a fee of five dollars toward the cost of the data furnished and the other expenses of conducting the study. Members of the Conference who notify the Secretary of their intention of taking part in the study and pay the required fee of five dollars will be enrolled as entrants, will receive the data mentioned below, and will receive copies of all notices, reports and communications sent out by the Committee.

Each entrant will receive (1) topographical map of the tract with key map showing its relation to the city; (2), a copy of the Model Housing Law; (3), a copy of the Building Code recommended by the National Board of Fire Underwriters, New York; (4) a circular entitled Data for Proposed Study in City Planning undertaken by the National Conference on City Planning.

Arrangements will be made to have the participants in the study meet each other and the members of the Committee at the City Club, 55 West 44th street, New York City, to discuss plans in process, on November 20, 1912; other dates for similar meetings will be announced later. Final plans with descriptions must be presented on or before March 4, 1913. The plans accompanying statements, etc., are to become the property of the National Conference on City Planning and will be exhibited at the next meeting of the Conference.

An invitation is extended to you to participate in the study, either individually or in collaboration with other members of the Conference. Remittances should be made to and the topography sheet and other data obtained from Flavel Shurtleff, Secretary, National Conference on City Planning, 19 Congress street, Boston, Mass.

Respectfully submitted,

Committee in charge of City Planning Study

John Nolen, Chairman, Harvard Square, Cambridge, Mass.,

B. A. Haldeman, Bureau of Surveys, City Hall, Philadelphia,

George B. Ford, 347 Fifth Ave., New York City,

John M. Demarest, 47 W. 34th St., New York City,

John Ihler, Secretary, 105 East 22nd St., New York City.

Some of the conditions necessary to carry out the scheme as formulated in the foregoing:

1. THE TRACT is assumed to contain 500 acres of land, located on the outskirts of a growing city of about 500,000 population, four miles from the center of the city but entirely within its corporate limits.

2. The rate and direction of growth of the city is assumed to be such that the tract when fully developed will be absorbed by the demand for building lots within a reasonably short period and at prices sufficient to repay the original investment in the land of $2,500 an acre, together with the cost of development, interest, taxes, selling cost and a fair profit.

3. The demand is assumed to be mainly for the erection of dwellings and for such other purposes as are normally incidental to such a development—retail stores, local places of amusement, schools, churches, etc.

4. In order to avoid discrepancies in legal conditions it is to be assumed that developments of private property are to be governed by the requirements defined in the Building Code approved by the National Board of Fire Underwriters and in the Model Tenement House Law modified to a Housing Law.

5. The General Plan should include (a) the location of streets and other proposed public properties; (b), the development of private lands in accordance with the general plan and with such control as could properly be exercised by ordinance or statute under the most favorable constitutional limitations in the United States; (c), the recognition of such control as might reasonably be expected to be exercised by public spirited land companies or other owners of real estate through restrictions in the deeds of lots.

Frequent meetings will be held by the committee at which the plans in process may be discussed. The first of these has been arranged for November 22d.

Lumber Grades

By JOHN CROWLEY.

THE carpenters frequently get into a squabble with the lumber yards regarding the grades of material delivered to them and it is the intention of this article to be of value in determining when and where to find fault.

As such lumber as oak, ash, maple, birch, etc., is seldom used by carpenters in their every-day work, I will not deal with the relative grades concerning this kind of material, but will give information about Norway pine, white pine, yellow pine and hemlock, the four kinds of lumber most used by them.

At the present time in buying what is known as number one or number two pine, we get a mixture of Norway pine and white pine, the grade being determined as though it were all either one or the other in place of a mixture. Occasionally a few pieces of spruce will be found among the Norway and white pine; this, according to the rules, is allowable. Spruce is a lumber of few knots, those that are found being small and of the pencil knot variety, although a few branch knots (commonly called spike knots) will be found now and then. The color of spruce is very white.

The natural inference when we speak of white pine is that the lumber is white, but this is not so, as the real color of white pine is light brown. This king of all lumber can be easily distinguished from all other pine by the silky, soft response to the hand, there being no other lumber as soft or easy to work. The only thing in the way of lumber which can compete with white pine in the way of softness is basswood, and while this stuff is easy to work and an ideal lumber for patterns, etc., it is not to be compared with white pine.

Norway pine is much harder and, while it does not contain near as many knots as white pine, it does contain a great deal more pitch, which will run from the lumber when it is exposed to the sun. This lumber is very strong and is desirable for building porches, being used for uprights, joists, etc.

Yellow pine is the hardest and strongest of the pine family. It has less knots than other pine lumber of the same grade, but contains more pitch. It is not as good as white pine or Norway for outside work, where it is exposed to the sun or where paint is to be used, but is being used considerably by carpenters for porch work, where a clear lumber is wanted and the owners are not willing to pay for clear white pine. The flat grain stock has a very pretty grain and is used a great deal for partitions, porch ceilings, flooring, interior finish, etc. Large quantities of six-inch number two flooring is used for sheathing, roofing, basement partitions, etc., as it is stronger than hemlock. For shelving boards, it is better than white pine for the same reason, the shelving grade of this lumber containing very few knots.

Practically all the joists and basement timbers in buildings are of yellow pine, because of its strength. Yellow pine and fir are often mistaken for one another, because of a similar color, but fir is a darker red than yellow pine. Cypress is also often taken for yellow pine, but has a more brownish cast and very little pitch.

Hemlock is usually the cheapest of all lumber and is used for studding, sheathing, etc., on a large percentage of the new buildings being built at this time. It is easy to work and contains few knots, shake being the worst feature of it. For use in the ground or around dampness it is more desirable than Northern pine or yellow pine, as it will not decay as quickly when used in such places as either of these two.

There seems to be a misunderstanding as to the meaning of the term number one common, some people being under the impression that number one means lumber without knots. This is not so, as the only lumber that does not contain knots is the first and second clear grades. This applies to all kinds of lumber. Number one common does contain knots, but they must be sound, as the term number one means sound lumber, nothing more.

Number two, of course, contains larger knots and more of them. It also allows loose knots and shake.

Exterior Details

By CHARLES P. RAWSON, Architect.

WE GIVE two pages of exterior details of the stucco house shown in this issue. The first page shows the construction of the main and porch cornices and the second page details the hood over the front door. All details are drawn to the scale of one inch equals one foot. The ceiling joists which are carried on a "ribbon" form the lookouts for the main cornice, the soffit of which is ceiled with beaded ceiling stuff. The rafters rest on the plate and on the joists also. The brackets are "built up" and are for appearance only, being supported by rather than supporting the cornice. Gutters are not shown as they are hanging gutters in all cases put up after the shingling is done.

The hood over the front door has the curve shown extended back from the front to the wall line and the curved soffit is ceiled with beaded stuff. The joists for same must be sawed to the curve. The rafters follow this curve at their lower end but are in a horizontal line at their upper end against the house. They should be placed not over 10 or 12 inches on centers in order that the curve may be as true as possible. The roof boards will have to be in short lengths, reaching only from one rafter to the next and in two or three inch widths in order to cover the warped surface of the roof. The shingles will have to be laid with the "weathering" varying in each course from the end toward the center. The length of the end rafter is about 60 inches while the length of the center rafter is only about 52 inches. If twelve courses of shingles are used, each course will be 5 inches to the weather at the ends and only 4⅓ inches at the center over the top of the curve. The brackets of the hood are also "built up" but are real supports.

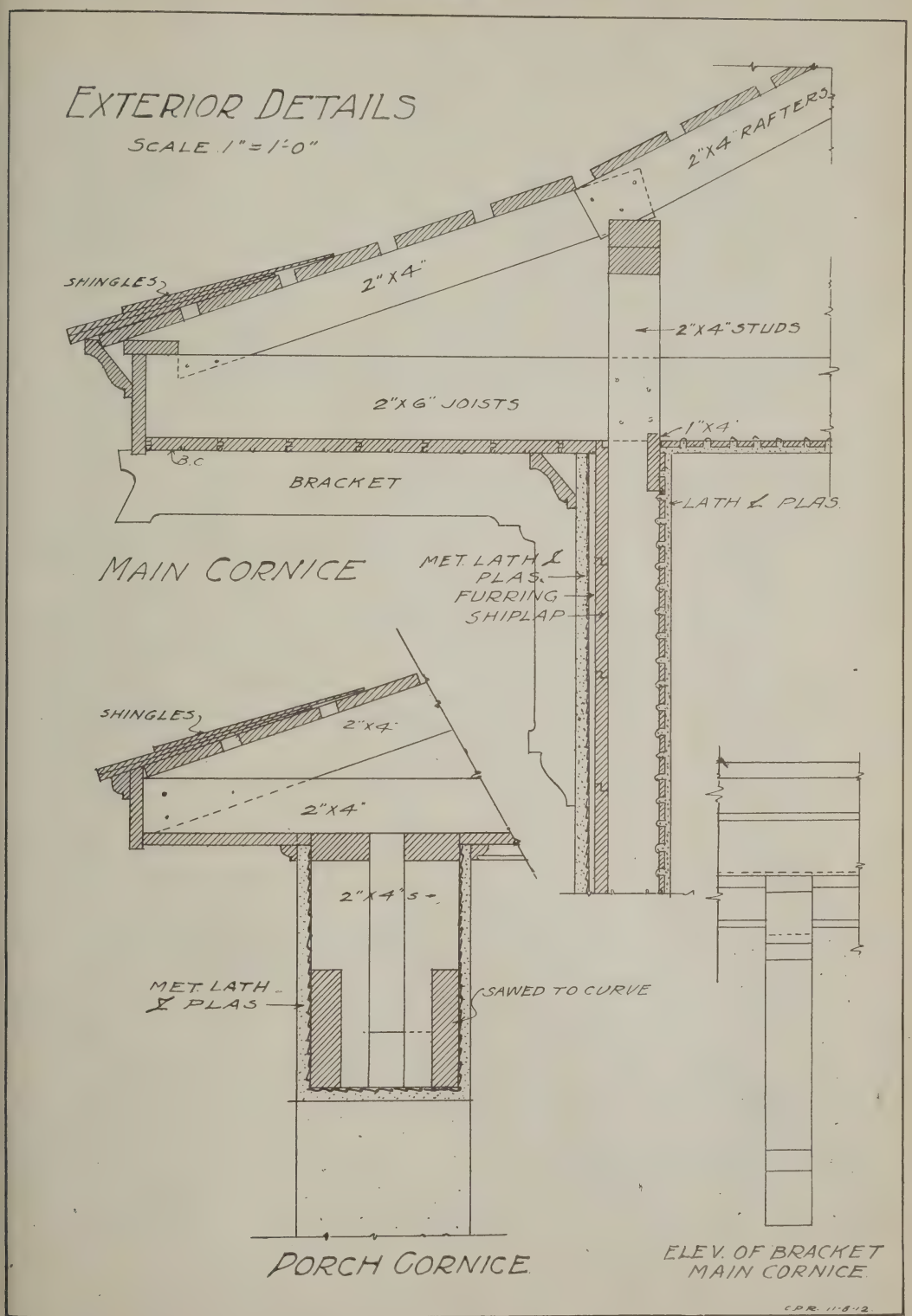
WATER CLOSET STALLS.

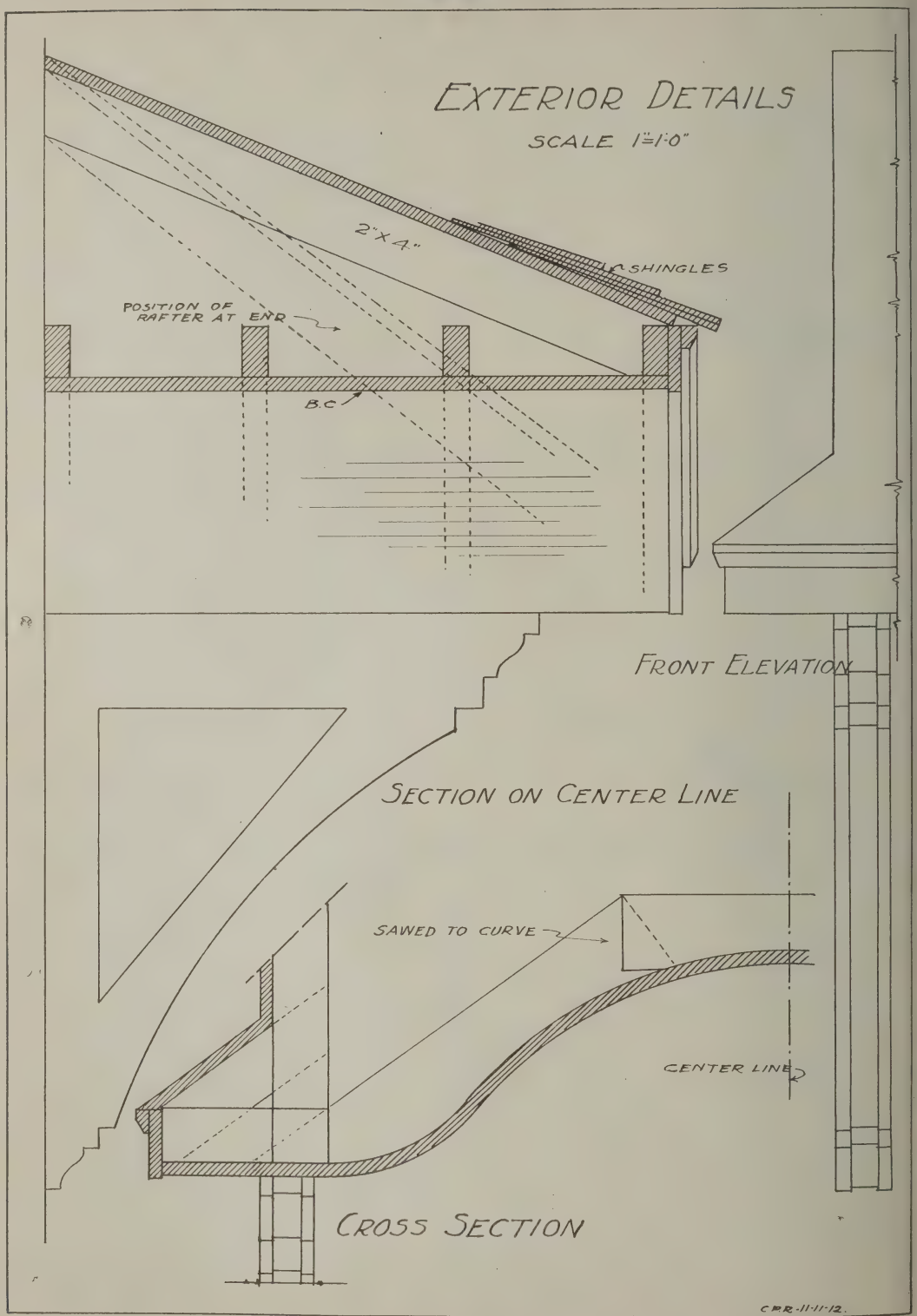
The third page of details this month shows the construction of a stall for water closets in public buildings where an economical compartment must be used. In the more expensive work, marble or slate partitions should be provided. The stalls shown are built of double faced, V-jointed, beaded ceiling supported by a framework of light timbers. The plan, elevation, and section given are drawn to the scale of one-half inch equals one foot and the details of the supporting framework and doors are drawn to the scale of three inches equals one foot. A metal leg is used at the front corners of each stall to support the framework above the floor. The doors are 1⅛ inch thick and swing in. The panels may be replaced with slats if desired.

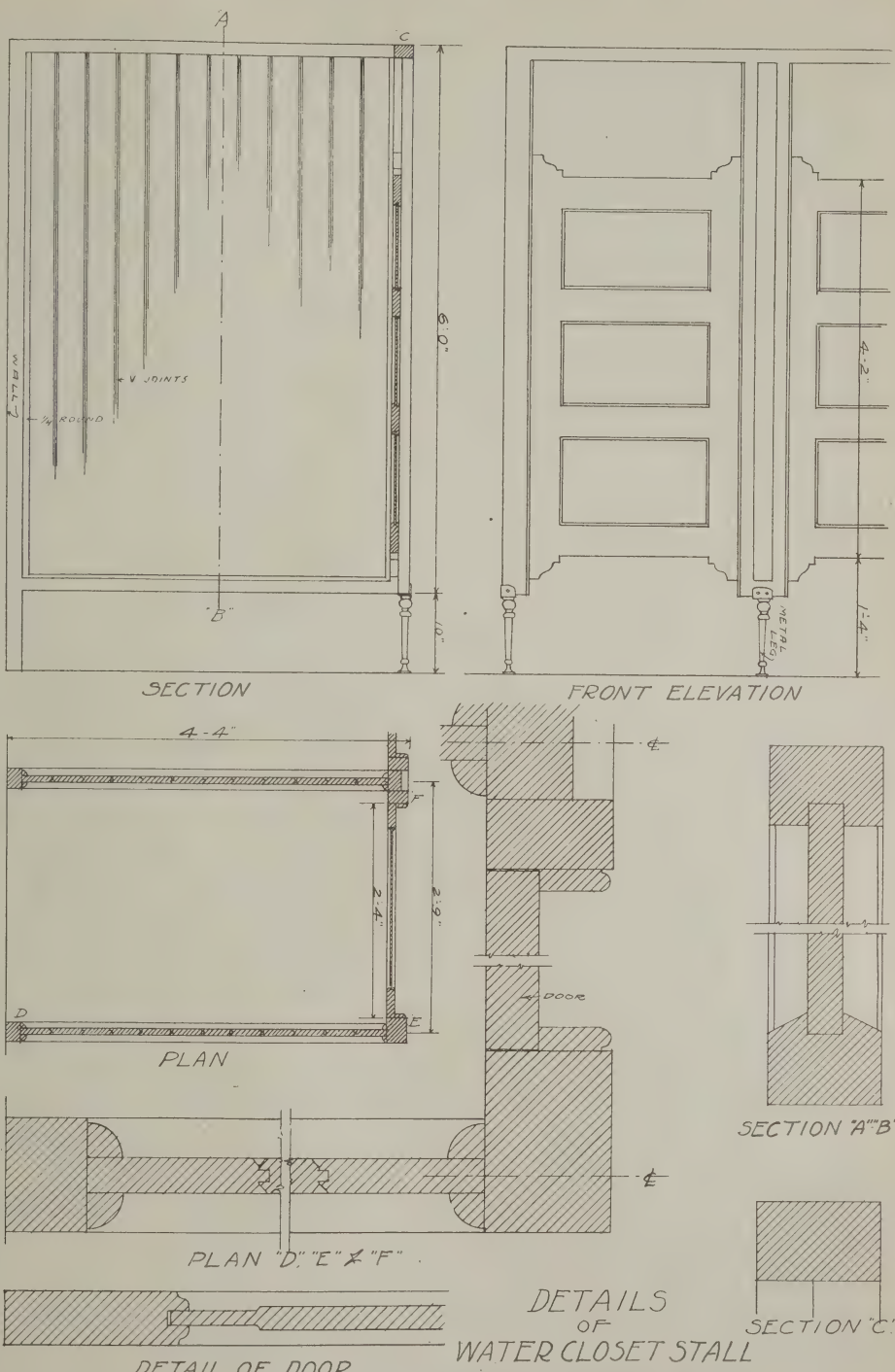
SHINGLING THE SIDES OF HOUSES.

In answer to enquiries regarding the shingling of the sides of houses, we would say that the cost in most localities is less than any other covering material. A cheaper grade of shingles with more exposure to the weather may be used for this work than for roof purposes. One thousand will cover about 150 square feet of surface and a man can lay as many per day as on a roof. Corner boards and water tables are usually omitted. The first course at the bottom should be double, as on a roof, and should extend a little to form a water drip.

The poorer shingles may be used on this first under course. All courses should be kept level and should come even with the top and bottom of windows, frieze boards, etc. It will be necessary to cut off the tops of the two last courses under windows, but the pieces should be used above the windows which should have a lipped cap. The frieze boards should be grooved at the back of the bottom edge and be placed first and the shingles cut to come under the same, fitting up into the groove. The courses at the corners should alternately lap over those on the other side and be cut off with a knife to come flush. A straight edge should be used to keep the shingles in a course in line. Do not use nails larger than three-penny and they should either be cut nails or galvanized. It is better to put the building paper between the studs and sheathing, rather than between the sheathing and shingles. This method prevents the punching of the paper by the many nails used in applying the shingles.


EXTERIOR DETAILS
SCALE 1"=1'-0"
2"X4" RAFTERS
SHINGLES
2"X4"
2"X4" STUDS
2"X6" JOISTS
1"X4"
B.C.
BRACKET
LATH & PLAS.
MAIN CORNICE
MET. LATH & PLAS.
FURRING
SHIPLAP
SHINGLES
2"X4"
2"X4"
2"X4"'S
MET. LATH & PLAS.
SAWED TO CURVE
PORCH CORNICE
ELEV. OF BRACKET MAIN CORNICE
C.P.R. 11-8-12.


EXTERIOR DETAILS
SCALE 1"=1'-0"
2"X4"
SHINGLES
POSITION OF RAFTER AT END
B.C
FRONT ELEVATION
SECTION ON CENTER LINE
SAWED TO CURVE
CENTER LINE
CROSS SECTION
C.B.R.-11-11-12.


A
C
B
6'-0"
1'-0"
WALL
V JOINTS
1/4 ROUND
4'-2"
1'-4"
METAL LEG
SECTION
FRONT ELEVATION
4'-4"
2'-4"
2'-9"
D
E
F
PLAN
4" DOOR
SECTION "A" "B"
PLAN "D" "E" & "F"
SECTION "C"
DETAIL OF DOOR
DETAILS
OF
WATER CLOSET STALL
SCALES:
PLAN, SECTION & ELEVATION - 1/2" = 1'-0"
DETAILS - 3" = 1'-0"
CBR 9-12-12.

Builders Reference Tables, By J. G. Robinson, Architect

SAFE LOADS FOR WOOD COLUMNS.

TOTAL SAFE LOAD IN POUNDS FOR ROUND POSTS & COLUMNS. LONG LEAF YELLOW PINE.

LENGTH	3½"	4½"	5½"	6½"	7½"	8½"	9½"	11½"	13½"	15½"	17½"
6'	7600	13300	20600	33000	44000	56000					
7'	7300	13100	20000	28800	41000	56000					
8'	6900	12500	19600	28200	38400	56000	70000	103000			
9'	6600	12000	19000	27500	37800	49200	65600	103000			
10'	6300	11600	18500	26900	36900	48100	61800	103000			
11'	5900	11200	18000	26300	36300	47600	61000	101000	128000		
12'	5600	10800	17500	25600	35800	46700	60100	91300	128000	173000	213000
13'		10300	17000	25000	35000	45900	59200	89800	128000	173000	213000
14'		9900	16500	24500	34100	45000	57900	88600	125300	173000	213000
15'			16000	23800	33500	44200	57000	87500	121900	173000	213000
16'			15600	23200	32700	43400	56500	86400	122600	168500	213000
17'				22600	32000	42600	55600	85300	121500	164100	213000
18'				21900	31400	41700	54800	84200	120200	162200	210900
19'						41100	53800	83100	118000	160300	209400
20'						40300	52900	82000	117900	159400	207800
21'								81000	116300	158100	206100
22'								79900	115000	156600	204200
23'									113900	155300	202700
24'									112400	153900	200300

LENGTH

TOTAL SAFE LOAD IN POUNDS FOR ROUND POSTS & COLUMNS. SHORT LEAF & TEXAS YELLOW PINE & OREGON PINE.

LENGTH	3½"	4½"	5½"	6½"	7½"	8½"	9½"	10½"	11½"	12½"	13½"
6'	6400	8400	12500	25000							
7'	6200	8200	12100	24500	33200						
8'	5900	7900	11600	23900	32600	42800	54000				
9'	5600	7600	11200	23300	32000	41700	53300	66000	80000		
10'	5300	7300	10700	22800	31400	41000	52500	65100	79300	94100	111400
11'		7300	10200	22300	30800	40100	51700	64300	78600	93100	110300
12'		6800	9700	21800	30200	39300	51000	63400	77800	92400	109100
13'				21300	29600	38900	50300	62600	76600	91300	107800
14'				20900	28500	38000	49500	61700	75500	90200	106800
15'						37300	48700	60900	74400	89400	105600
16'						36600	48000	60100	73500	88300	104400
17'								59200	72600	87400	103200
18'								58300	70800	86500	102100
19'										85400	101600
20'										84400	100500
21'											
22'											
23'											
24'											

NOTE — THAT PART OF THE TOTAL LOAD IN EXCESS OF THE HUNDRED POUND NOT GIVEN IN TABLE.

LENGTH

TOTAL SAFE LOAD IN POUNDS FOR ROUND POSTS & COLUMNS. OAK AND NORWAY PINE.

LENGTH	3½"	4½"	5½"	6½"	7½"	8½"	9½"	10½"	11½"	12½"	13½"
5'	5900	10300	15600	22400	30500						
6'	5700	10000	15300	22000	29800						
7'	5400	9600	15000	21500	29300	38300	48400				
8'	5200	9400	14700	21200	28800	37800	47700	59000	71400		
9'	4900	9000	14300	20600	28200	37000	46900	58200	70500	85200	98600
10'	4700	8700	13900	20000	27700	36300	46400	57500	69600	83100	97700
11'		8500	13500	19900	27200	35900	45700	56800	68700	82500	96800
12'			13100	19300	26600	35300	45100	56000	68100	81400	95800
13'					26200	34700	44400	55300	67300	80400	95100
14'					25600	34100	43700	54500	66400	79700	93900
15'							43000	53800	65600	78900	93100
16'							42400	53000	64800	77900	92100
17'								52300	64000	77000	91000
18'		J. G. ROBINSON.						51600	63100	76100	90000
19'		ARCHITECT.							62400	75200	89100
20'									61500	74300	88200

LENGTH

TOTAL SAFE LOAD IN POUNDS FOR ROUND POSTS & COLUMNS. SPRUCE, WHITE PINE & CAL. RED WOOD.

LENGTH	3½"	4½"	5½"	6½"	7½"	8½"	9½"	10½"	11½"	12½"	13½"
5'	5000	8600	13200	18900							
6'	4810	8400	12600	18400	24900						
7'	4600	8100	11900	18000	24400	32000	40500				
8'	4400	7900	11200	17600	23900	31600	40000	49900	59700		
9'	4200	7600	10500	17300	23400	31100	39400	48700	59000	70300	82500
10'	4000	7300	9700	16900	22900	30600	38900	47600	58400	69700	81700
11'			9200	16500	22400	30100	38300	46500	57700	69100	80900
12'			8300	16100	22000	29600	37800	45400	57100	68500	80200
13'					21500	29200	37300	44300	56400	68000	79400
14'					21000	28700	36700	43200	55800	67400	78700
15'							36200	42000	55100	66800	77900
16'							35600	40900	54500	66200	77100
17'								39800	53800	65600	76400
18'								38700	53200	65000	75600
19'									52500	64500	74800
20'									51900	63900	74100

LENGTH

SEE NOTE ABOVE :

Economy By Expenditures

By T. A. TEFFT.

AS soon as anything about the house gets out of order, or shows premonitory signs of doing so, it should be at once repaired or replaced, because if the smaller things are neglected their impaired functions soon involve other interests, and an ever widening circle of deterioration results.

Every house owner should make a systematic inspection of the house, both inside and out, and it would be the best of economy once a year to go over the house with the carpenter, mason, and plumber, in order to determine whether any major repairs are actually needed.

For the interior where repairs are usually the more expensive, it should proceed systematically from attic to celler, room by room, or if it will not consume too much time, it will probably insure a more effective inspection if the house were gone over several times—plastering first being scrutinized, woodwork next and plumbing last.

Cracks in plaster result from two causes: a fracture of the wall against which it is placed, or a local fracture, affecting only the plastering itself. That a crack belongs to the former category may be ascertained by examining the exterior of the wall to which it is attached, or if this be not possible (as may sometimes happen in the case of party walls) by tapping on or pushing against the plaster in the immediate neighborhood of the crack itself. Where the wall behind it is cracked the plastering will usually be found sound and firmly attached to the wall except over the crack itself. Where the crack, however, arises from a condition of deterioration in the plaster, the plaster in the immediate neighborhood of the crack will also almost certainly be found to be loosened from the wall behind. In such a case it is only a question of time how soon it must be cut out in a larger or smaller patch, according to circumstances and replaced by new.

Where plastering is placed directly upon brick walls, it is not likely to become detached, unless either the plaster itself or the workman who put it on the wall was distinctly inferior. Detached and bulging plaster is more likely to occur on wooden laths, where it arises from the fact that the key, clinch or hook-over of the plaster behind each lath was either originally imperfect (owing to unskillful workmanship), or because the clinch originally formed has become broken, either because the plaster was of inferior quality or because (as more frequently happens in the case of a ceiling) there has been unusual movement on the floor above. In any event, whatever the cause there is no remedy but new plaster.

Plaster on walls or ceilings may also become loose through leakage of water from roof tank or pipes and if the leakage has been large in quantity at any one time, or long continued for a smaller quantity, the plaster is certain to become detached sooner or later. It is therefore wise to make the repairs at once if the leak has been stopped, provided it is made certain that it will not occur again. Pipes running under the floor would be usually repaired by taking up the floor rather than tearing out the ceiling below, but even in this case it would be wise to renew so much of the plaster as shows a water stain. It is leakages of this description which make a hot water system in a house so undesirable, especially when the walls and ceilings have decorations of any expensive character upon them. Hundreds of dollars' worth of damage of this character has been caused by a single leak in a hot water pipe.

Loose plaster on a ceiling, it is true, has a marvelous capacity of maintaining itself, even for years, but this only results when the original plaster was of the very best character with plenty of first class cattle hair mixed with it. Nevertheless, it is always liable to come down at any moment, and usually without warning, with serious resulting injury, not only to "property," but to "person."

Sometimes on a ceiling, where the plastering has become detached in this way, it is not always possible to detect it with certainty by the eye alone, but if a straight stick several feet long be placed against the ceiling it can easily be detected.

Plaster on wire lathing or metal lathing of any sort is not likely to crack or become detached even though the wall behind it should be seriously fractured; but metal lath unless galvanized or painted before the plastering is put on, is likely in the course of

time to cause iron stains which will show through the paper, paint or other decoration.

Shrinkage cracks are another type. These occur in wooden houses and are due to the drying and shrinkage of the timbers which either form or support the wall or partition. In such a case, while the wooden partition itself is not actually fractured, it is thrown out of alignment either vertically or horizontally and so of course fractures will occur in the plaster.

Such shrinkage cracks will cease in the course of a year or two and the best treatment for the plaster in such case is to effect temporary repairs by stopping up the cracks with plaster of Paris and when the movement has ceased, if there is a considerable fractured surface, it had better be cut out and replaced. It is on account of these shrinkage cracks that it is always better policy in a new frame house to postpone any permanent system of decorating the walls for at least a year, resorting either to calcimine, or the cheaper grades of wall paper. After the movement has ceased, or at least greatly diminished in its scope, permanent decorations can be proceeded with.

Rotting woodwork will occur either through leaks or, possibly, from inherent and original rottenness in the wood itself. What is known as dry rot is the most serious, because this is likely to affect the entire stick of timber; and, as it is infectious, it will, unless checked, spread to the adjoining portions of the wall partition or floor. Such timbers, when detected by exploring with a knife blade or tapping with some hard substance, should be removed, together with any adjoining parts which seem to be also infected, and replaced by new and sound stuff. Dry rot in a floor is a more serious matter, because it may proceed until the whole floor is affected, causing a collapse. When, therefore, any floor shows undue springiness, as if it were unable to bear safely the weights ordinarily placed upon it, it should be examined and sufficient inspection of the floor timbers made to satisfy oneself that the floor is not becoming progressively weaker through dry rot. Such springiness may of course arise from the fact that the floor beams are too small for their span; a defect very common in cheap houses and one resulting in a lack of stiffness in the floor with consequent serious cracking in the plastered ceiling below.

Such floors are not necessarily in danger of collapsing unless some unusually heavy weights be placed upon them, such as a crowd of people or a very heavy piece of furniture, or a piano, or safe or other similar object which concentrates its weight upon a relatively small floor area.

Ordinary exterior woodwork may be protected for many years if sound by having the painting renewed at sufficient intervals to keep it in good condition. The frequency of such intervals will be determined by the original character of the paint.

Cheap paints require renewing almost yearly, while the best quality of paints will last for four or five years unimpaired. It should be noted, however, that woodwork does not, if on the exterior, need to be painted to preserve it. There are many old and unpainted houses, and roof shingles which often have no preparation on them at all will last for a long series of years if the wood from which they were cut was originally sound. Moreover, it should be noted that the painting of woodwork from which the sap has not thoroughly dried out is certain to cause decay, which will probably take the form of dry rot and proceed very rapidly to the entire destruction of the piece affected.

Woodwork to remain sound must be freely exposed to fresh air, and the painting of green wood excludes all air and permits the fungi which produce decay to develop with astonishing rapidity. It is not dampness, but lack of fresh air circulation which is the chief enemy of all woodwork used for building.

With regard to paints in general, it may be noted that the really durable paints are those whose basis is white lead. Therefore, the lighter in color the paint is, the more lead it contains, and the more lasting it is likely to prove. The chief exception to this is the well-known red lead, which, when genuine, is equally durable. But the color of this precludes its use, except as a priming coat on metal work, for which purpose it should be regarded as, on the whole, a most satisfactory material.

The part of the interior woodwork that is likely to give the most trouble is the floor. Floors should never be painted, because it is quite as impossible to keep a painted floor in good condition as it is to make its looks originally acceptable. A floor should, therefore, if it is not to be entirely covered with a rug, be stained. What are known as

water stains usually give a better effect than the oil stains, especially when applied by unskilled hands. By better effect is meant a brighter and more uniform color. When dry, however, they must be thoroughly varnished with at least two coats of some high grade floor varnish. Cheap varnishes are not worth the price of the cans they are sold in, since they will either darken and discolor the floor, spot with water, scratch, and probably be so sticky that for all time dust will adhere to the floor surface, from which it is impossible to remove it.

The best grades of floor varnish are expensive, but as they are very durable, it is not worth while for the amateur to try his or her skill in applying them. If they are once put on by a skillful painter and properly rubbed down between the coats (the last coat having a little wax added to it) the job is done for years to come; and beyond a little occasional touching up with wax, is not likely to require much further attention.

All of these processes of course are somewhat expensive, and it is therefore advisable in all houses of moderate cost to have only the borders of the rooms so treated, leaving the major portion in the center to be covered by a carpet or a rug.

There are ready-made hardwood floors, which consist of a rather thin layer of wood backed on canvas or some such material which can be bought at reasonable prices, and if put down by a skillful carpenter as a border, give very satisfactory results. They are finished, of course, in the usual way.

Staining is the cheapest method of treating interior woodwork, and, otherwise than on floors, may be regarded as sufficient if the water stain be followed by a coat of pure linseed oil with just sufficient Japan dryer in it to insure its becoming hard.

Almost all of the woods will take stain well, even yellow pine, and these stains need not have regard to the natural color of the wood, but may be greens, reds, blues, or any other color which will harmonize with the color scheme of the room as a whole. Cypress is an excellent wood for such treatment and is very durable both for exterior and interior finish.

A very commendable fashion which is coming in is to stain the exterior woodwork of a house rather than paint it. This gives softer and more agreeable effects and on the whole is probably better for the woodwork itself. Dark browns and greens for the exposed ends of roof rafters, woodwork of the porches and varandas, etc., give excellent results. Shingles, whether on the roof or the side walls, may be left untreated in order that they may acquire a silvery weather stain, which is the most beautiful of all. Roofs quickly acquire this, but side walls far more slowly, and during the process of acquiring it, are almost certain to color unevenly, making a disagreeable effect, which has to be endured sometimes for as long as five or six years.

For this reason, it is perhaps more advisable to stain the shingles, dipping them for not more than one-third of their length in a shingle stain, of which Cabot's is one that may be generally relied on, though the most durable of all stains is perhaps the creosote stain, which gives on light wood shingles an agreeable brown effect. In cypress and redwood shingles the effect is somewhat darker.

The light shingle stains are mixed with less durable pigments, which, in the course of time, will wash off more or less completely; sometimes the washing off process is a slow one, and when complete, the shingles will be found to have acquired an agreeable and permanent color though different from that originally intended.

Where the walls or woodwork of a house are painted, the most difficult problem which results from this treatment is that of keeping the surface clean without repainting. The water paints or fresco colors cannot be washed with water, but stale bread may be used to wipe off serious blemishes. This process may also be used for wall paper. Good oil paint should stand washing with soap and water if it has a decided gloss. If it does not show any gloss, it is better to resort to soft artist's rubber for individual spots of small size. If the paint is much defaced, nothing, of course, will serve but repainting. This process has one decided advantage in that it gives us the opportunity of changing the color scheme of a room if we wish to do so.

Paint which has blistered about a fireplace can be renewed only by sandpapering and repainting on the spots affected, although it is better to refinish the whole mantel as it is always difficult to match with new paint old paint which has acquired a certain tone through age.

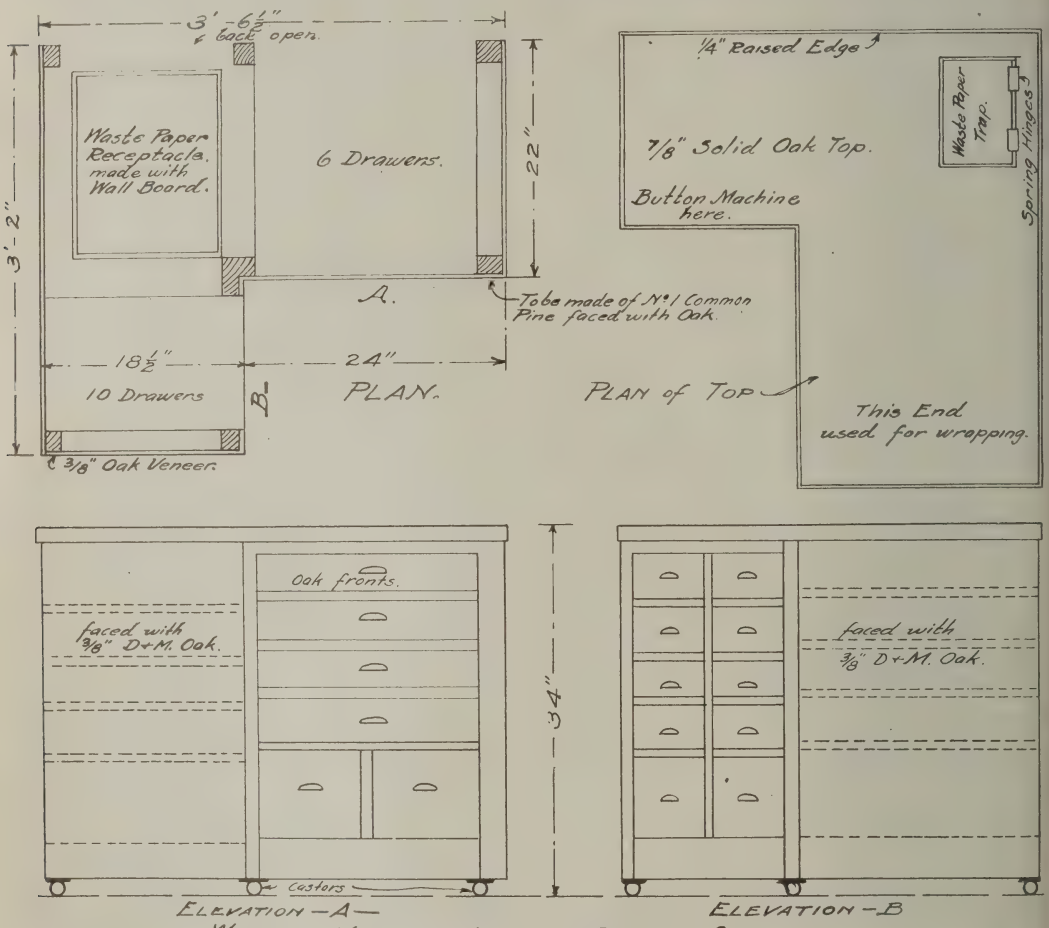
Some Problems of the Jobbing Carpenter

By WM. C. A. STEVENSON

A LESSON IN SPACE ECONOMY.

It often happens that the jobbing carpenter is called on to fit something into a very small space to serve a large service.

The writer is showing herewith a sketch plan of a work and wrapping table he recently built for a shoe store that gives a good lesson in space economy. He believes it will prove of interest to a number of the NATIONAL BUILDER readers.



WORK AND WRAPPING TABLE AND DRAWER CABINET.

It will be seen by the plan that this cabinet takes up a space of only 3'2"x3'6½" with a corner 16"x 24" out of this. In this limited space we provided sixteen drawers for shoe findings such as buttons, laces, heel plates, polish tools, etc. A large waste paper receptacle was made in the blind corner with a small trap door over it in the top. The cabinet was on casters, and in order to empty the waste paper box, it was only necessary to roll the cabinet from the wall and pull the box out from behind. One end of the top was used for the button machine; the other for wrapping parcels on.

I made a frame of 2"x2" common pine and cased it around with ⅜" oak flooring. The drawer fronts and top were oak. When finished, it made a very neat looking fixture, as well as compact and useful. The waste paper box was made with a solid ⅞" board for the bottom; the sides were wall-board, a quarter round in the angle on the inside and a corner head on the outside. This made a very light, yet very strong box.

Save The Scraps

By J. CROW TAYLOR

JUST as in the old pioneer shooting match days, when some men in the community put up a beef and the neighbors all gathered and shot for the choice of parts, there was a rule that the hide goes with the tallow, so is there in the carpentry and building trade today a sort of unwritten rule, existing by virtue of common practice, that the scraps go with the job.

The usual plan followed is that when a house is finished there is left in the basement or cellar a great accumulation of scrap. Some of it is small scrap and good for nothing but kindling, but it may include everything from sticks and shavings up to pieces of boards four feet long and occasionally some half length flooring boards and things of that kind.

Some contractors figure so close that there is only a small amount of scrap, but quite commonly there is enough scrap left from building an ordinary frame house to fill up the bed of the average builder's run-about wagon.

The chances are he leaves that right in the cellar, makes a donation of it to the man he builds the house for, and lets him use it for kindling or any purpose he desires.

Then the carpenter goes to another job and about the first thing he has to do is to cut up a lot of bridging or something to make stakes, then he cuts up some 2x4 and some strips and boards to put up false work for his foundation, and in the process of building he cuts up a lot more of 2x4 to get the blocks and braces of one kind and another and makes from his good lumber a lot of scrap material that he has really left behind at the other job.

When you build a house for a man you agree to build him a house, and there is nothing in that agreement that involves giving him a wagon load of kindling or leaving him from 100 to 1,000 feet of scrap lumber of one kind and another. This scrap belongs to you and the time is here now when it is worth looking after.

In days gone by when lumber was cheap a little scrap did not make much difference, but those were back in the days when down in the cotton fields they threw the cotton seed away and regarded it as a burdensome lot of waste, and since that time there has been a great awakening.

The cotton people have learned to make of this scrap pile, this waste product, one of the most valuable features of the business. And it is not merely the cotton people, but the packers and many other lines of industry where the waste product has been utilized, it has been made into such a valuable asset that if there were no other profits but that of the waste alone the business would be good paying.

It is time for the carpenter and builder to take cognizance of this same idea and to realize that in saving and utilizing his waste is one of the places that there is a great chance to improve his profits.

The waste product belongs to you if you bought the lumber originally to build the house, and it is up to you to get full value out of every foot of it. Some of it you can use on the next job and the rest of it you can take home to your own shop, store it away carefully, and from time to time it will save you from buying much new lumber.

Take an average town during the building season and one man could get material enough to keep him busy and make a good profit out of it by simply gathering up the waste left behind and converting it into some useful purpose. There is no reason why every carpenter should not do the same thing. That is one of the reasons for having a shop.

Do not merely take the waste and treat it as a joke by hauling it and dumping it in the yard or all around your shop, but take care of it as something valuable. A foot of lumber is a foot of lumber no matter whether it is in small dimensions or large and by proper attention you can find a place to utilize practically every bit of it and it is in the proper utilization of this waste that you may often turn the tide from mere living to profit making and progress that will put up in the ranks of business men where you are entitled to a place.

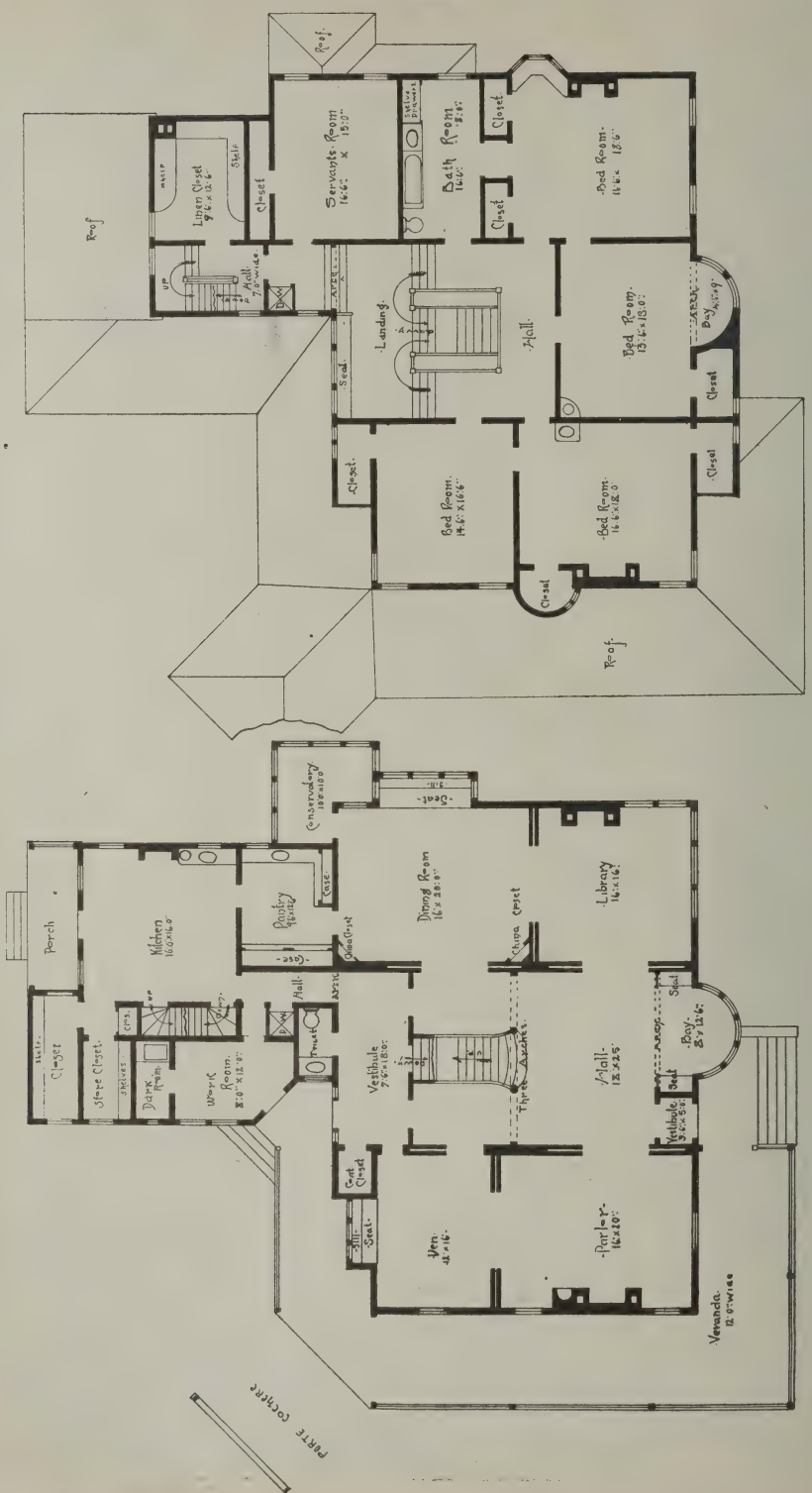
Country House for Mr. H. K. Wilcox.

E. G. W. Dietrich, Architect.

Country House for Mr. H. K. Wilcox.

For Plans See Page 66.

E. G. W. Diedrich, Architect.



Sketches for MR A.K Wilcox
E.G.W. Dietrich Architect

The Small Shop

By HUGH H. CHAMBERS.

I NOTICED in the November number of the NATIONAL BUILDER you ask how some of us spend the winter months; whether they are profitable to us or not.

I will tell you how I spend the time when there is no work in the building business during the winter months. I am a carpenter by trade, so you must excuse me if this article does not have as good an appearance as it should. I have a shop 12x16 feet inside measurements, with a small room built on one end for an engine—not very large for a shop, but it can be built larger in the future as the work expands.

For power I had a 2 H. P. steam engine, but recently had it exchanged for a 3 H. P. gasoline, which is more convenient for short runs, as I work there in the evenings also in the summer. The machines that I now have are a combination band-saw, rip-saw, cutoff saw and jointer, the latter is a Parks machine and I must say a good one. Then I have a turning lathe, 6 inch swing, 3 feet between centers. I made the frame for it and bought the iron parts, such as centers, counter-shaft, etc. I also have a Barnes scroll-saw—a small shop could be run without one when there is a band-saw, but they each have some advantages in special kinds of work so that one will not replace the other. And last, but not least, is the emery wheel. I could hardly estimate its worth, it is used so much.

Now, a word or two about the arrangement of machines. The engine sets out of the way in a room of its own, which is the best way as it is out of the dirt and dust. Overhead, along one end near to the engine, is the line shaft. From engine to line shaft is a short 3 inch belt and tight and loose pulleys on a shaft, which saves turning the shaft when starting the engine. Each machine has a tight and loose pulley, so it is easy to start one machine or all when the engine is running. In one corner, I have the turning lathe; in the other I am going to put a boring machine. It and the lathe will stand right under the line shaft. Now, for the dollar and cents end of it. Someone will ask, "Does it pay?" I can say it does. Take, for instance, porch swings. I buy the material which is No. 1 white oak, for an 8 foot swing for $2.25. The swing when finished will sell at $12.00. The work on it can be done in a little more than a day. On these alone I can almost keep busy when not at house work. Screen doors are another thing that there is a good profit in the making. The material for a 3x7 oak screen door will cost at the mill about $1.00, yet finished it will sell for $4.00. The things that can be built in a shop of this kind are almost numberless. I have made book-cases, music cabinets, center tables, library tables, foot stools, pedestals, etc. I also built a roll-top desk for my own use. The size I wanted were selling at $54.00 to $75.00 each in the stores. It is all oak and cost me for lumber, nails, glue, varnish, filler, etc., $9.50. It is needless to say that it paid to build it myself.

Another thing I find in favor of the small shop is that a good many people have ideas of their own that they can have worked up in a small shop a great deal better than if they were dealing with a large mill.

There are also a great many things a small shop gets to do that a mill does not handle, such as repairing chairs, washing-machines, tables, etc., all of which is profitable to the workman.

Anyone having a shop built and equipped like this one will have no trouble to keep busy in the winter, but it pays to build large enough to have plenty of room to work in—16x22 is a good size where the ground is available. I would also advise anyone about to purchase power for a small shop to use a gasoline engine. It costs but 1 cent an hour per H. P., or 30 cents for a ten hours' run for a 3-H. P., varying with different engines.

Of all the machines I think the rip-saw the most useful, and believe others who have used them will agree with me. It can be used for a great many things other than ripping, rabbeting, grooving, etc.

In closing, I wish to say that the small shop has been a source of profit to me and I firmly believe it will be to others.

Hand Mixing of Concrete

ALTHOUGH upon all extensive operations concrete is now mixed by a machine, says Sanford H. Thompson, hand mixing is necessary, and may be even economical under certain conditions: (1) where the quantity of concrete is so small as to prohibit the expense of purchasing or renting a mixer; (2) where concrete is laid in so thin a layer or at so many different places that the cost of the frequent moving of a mixer counterbalances the saving otherwise realized, and (3) in beginning large jobs before the machinery has arrived or where the work is slow at the start. The cost by hand mixing, therefore, should be estimated not only when it is obviously the only method to use, but also to determine whether hand work may not be the cheaper.

Notwithstanding that comparative tests have usually shown machinery-mixed concrete to be the stronger, with careful superintendence, hand mixing will give first-class results. Concrete of wet consistency, soft enough to flow sluggishly, such as is used in building construction, is less easily worked by hand than a mixture of stiffer plastic consistency.

The cost of mixing by hand varies with local conditions, but when, as is usually the case in any particular job, the local characteristics are known, it is possible to estimate the cost very closely instead of making it a matter of mere guess. To be sure, the experienced engineer or contractor may guess quite accurately, but almost anyone will fall down once in a while and make a mistake which may amount to a large percentage of the cost, enough to make a difference between profit and loss, when conditions are different from those with which he is familiar. With the proper data at hand it is just as easy and takes no more time to estimate accurately than to study the problem carefully enough to hazard a guess which will include all of the variables.

The strength of hand-mixed concrete is but little affected by the system employed in mixing the materials, provided they are turned in a proper manner and a sufficient number of times to incorporate them thoroughly. Some engineers prefer to make the cement and sand into a mortar, while others do not add the water until the final turning. Excellent work is produced by both methods but the final is slightly more economical because shoveling the mortar on to the stone involves more labor than handling the dry mixed cement and sand. For example, comparative tests show that it costs less to mix the cement and sand dry, shovel the mixture on to the stone, and turn three times than to make a mortar, shovel it on to the stone, and turn only twice. Still other methods are sometimes employed, so that they all may be summarized as follows:

(1) Cement and sand mixed dry and shoveled onto the stone or gravel, leveled off, and wet as the mass is turned.

(2) Cement and sand mixed dry, and the stone or gravel dumped on top of it, leveled off, and wet as the mass is turned.

(3) cement and sand mixed with water into a mortar which is shovelled onto the gravel or stone, and the mass turned with shovel.

(4) Cement and sand mixed with water into a mortar, the gravel or stone spread on top of it, and the mass turned with shovels.

(5) Gravel or stone, sand and cement, spread in successive layers, mixed slightly and shoveled into a circle or crater, water poured into the center, and the mass mixed with shovels and hoes.

The last method is applicable only where a small amount of concrete is to be mixed on the ground with no mixing platform or mortar box.

Mixing of the sand and cement must be done just before they are needed. If mixed more than half an hour in advance, the natural moisture, which all sands contain, will make the cement set and cake.

"Mrs. Newritch has put a beautifully carved sun dial in her Italian garden."

"Yes?"

"And she has arranged to have it electrically lighted at night so she can tell the time at all hours."—Cleveland Plain Dealer.

A Modern Colonial Entrance.

Joe Holebrook's Luck

By BEN F. COBB.

YES, said Joe Holebrook, as he started to tell the story he promised me, "I have always been called a lucky cuss, and it must be true. In the first place, I was lucky in picking out my parents. My father was a good natured, easy going man, who cared more for comfort than work, and there wasn't a worry in him. I took my 'don't worry' from him, but that was all I did take from him, and when he laid down and died, because it was too much of an effort to get well, that was all he left me. However, I have no fault to find with my father; he was good to me.

"My mother loved him even though he could not dress her very fine. Mother was made of different stuff. She was a small woman and full of ambition. When she found there wasn't any use trying to put any ambition into father she turned her attention to me, but I didn't need much attention. I was going to school days, and selling papers mornings and evenings, and making things out of wood at night.

"Father said I ought to be a lawyer. The reason he said this, he explained, was that the lawyers didn't have much to do, but mother and I knew it cost money to make lawyers, and I had gotten it into my head that if they made a lawyer out of me they would be spoiling a good mechanic. You see I decided early that I had some ingenuity, and I felt that I could make a mechanic out of myself without much trouble, so after I left school I went to work as an apprentice to a carpenter-contractor by the name of Henry Dorsey.

"Old man Dorsey was a good mechanic but a poor business man. I worked for him a year at $3.00 a week; perhaps I got $4.00 the latter part of the time. I don't just remember now, but I had not worked for him for more than six months before I was awake to a fact, or rather to two of them. First, that the old man was hiring men all the time for cheap jobs that could not do as much work as I could, and paying them from $2.00 to $3.00 a day. And second, I was not learning anything only as I could pick up the ideas from the workmen. In reality, I was stealing my trade, but the ideas that I stole I retained and practiced with them nights.

"Then father died and left us with nothing to help ourselves to but that old saying of his, 'Don't worry'. He did not even leave any debts to pay. We were square with the world.

"I was eighteen then, and a good hulk of a boy. When the funeral was over I sprung an idea on mother that had been in my mind for several months, and, strange to say, she approved of it. You see mother knew I was lucky.

"I had figured it out this way, if these jack-leg carpenters who could not do as good a job as I could, could come from Omaha to Kansas City and could get from $2.00 to $3.00 a day, why couldn't I go to Omaha, where I wasn't known, and do the same thing.

"I had collected my money of old Henry when father died. After I had decided what to do went to him and said: 'Mr. Dorsey I guess I will have to give up learning the trade with you now that father is dead."

"What has that to do with it," said old Henry? "You have got to work somewhere, haven't you?"

"Yes," said I, he had given me an idea and I had sprung it, "but I have got to take care of my father's estate."

"Oh," said old Henry, "I was not aware that your father left an estate. Of what does it consist?"

"Don't worry," said I, and I was off, leaving old Henry with a look on his face that would have puzzled a seer.

"Mother and I moved to this town and brought our household goods with us, and after we had hired a house, paid a month's rent, and moved our stuff into it, we had just $10.00 left. The first man I asked for a job I told I was worth $3.00 a day. My luck was with me and he believed it. The first job he set me at was laying out rafters for a pitch roof. I was there with the goods for I had studied the rafter business and had it down fine, although I never actually laid out a rafter in my life.

"I worked with Mr. Carlton all summer, and, somewhat to my surprise, he kept me on inside work after he had let most of the cheap men go. I guess I looked my surprise, for he said to me, 'I am keeping you, Joe, because you are always at work. You aren't such a h—— of a carpenter, but you

do try, and I always find you doing something even if it ain't so bright.' That was more of my luck."

"In February everyone was laid off. It was a cold winter and all the contractors were laying off men, but my luck was with me again. I went down to Wilson's livery stable and got a job as hostler at $9.00 a week. That was not quite as good as $18.00, and I had to work seven days in the week and some into the night, but mother and I had saved up some money and this $9.00 per would support us and allow us to keep our bank account intact.

"The first of April came and I was thinking of looking for another job when my luck showed up again. Mr. Carlton sent for me."

"Joe," said he, "are you hungry enough to work for $2.50 a day for a while?"

"Why should I be hungry, Mr. Carlton? I haven't lost a day this winter."

"Where have you been working?"

"Down at Wilson's stable."

"I didn't know they kept a carpenter there all the time."

"Well, they are keeping me there, and Mr. Wilson tells me I can stay as long as I like."

"All right, you come back to work for me and I will give you $3.00 the same as I did last time."

"And that was what I did.

"I worked for the old man four years without losing a day, and was wondering how I could get into business for myself. All I knew of customers were those we did work for, and I didn't want to hurt the old man as he had been very good to me; in fact, I had gotten to be his foreman and knew the customers better than he did.

"I had my trade down pat by this time and you could never guess how I learned it. After the old man made me foreman I used to hire the best workmen I could find. At least I would have one or two of the best in the country, and I managed to stick close to them and learn everything they knew.

"I always found that each good mechanic I hired was especially good at some certain line. When I found out what that was I put him at it and worked with him until I had pumped him dry.

"One morning I said to Mr. Carlton, "Don't you think you have been in business long enough to retire?"

"What do you mean?"

"I mean that I have worked for you for four years, I know all of your customers, I figure on all of the jobs with you, and I think I could do pretty well on my own hook."

"Oh! you do, do you? After I have given you the best chance you ever had in your life you want to take my business away from me?"

"No, I don't want to take anything from you. I will buy a half interest in the business; perhaps that would suit you better?"

The old man's eyes brightened. "Yes, that will be all right. I will figure up and see what sort of a proposition I can make you."

"You don't need to figure anything up on my account. I have my mind made up now as to what I will give."

"Well, what will you give?"

"The way I figure it, your shop, office, and tools, are worth about $2,000.00. I have $200.00 worth of tools myself. That would leave a difference of $1,800.00. I will give you $900.00 for a half interest in the business."

"How about the good will and my name?"

"As far as the name is concerned, mine is just as good as yours, and as for the good will, suppose I should set up for myself how much of your good will would you keep?

"Say, but the old man was mad! He called me an ingrate and several other things, and went away and kept out of sight all that day. The next morning when he came on to the job he called me to one side and said:

"Look here, Joe, why didn't you tell me that you and my girl were going to get married? I went home last night and made a fool of myself telling what I thought of you and the way you had treated me, and both wife and daughter laughed at me. I guess I will have to accept your offer, and if there is anything else you want just name it; the old woman or anything."

"No," said I, "no, the girl and the half interest in the business will do me. So you see my luck was with me again."

"Your story is all right, Mr. Holebrook, but I thought you was going to tell me how you made such a success in business. I promised the readers of THE NATIONAL BUILDER that I would give them a good story in the December issue."

"Well, don't you think a story of my luck will make good reading? Besides, you know I told you that the biggest part of my success was due to the people I have worked.

I worked old man Carlton for a half interest in his business and worked myself into the good graces of his wife and daughter.

"I am the first man on the job in the morning and the last one to leave it at night. I hire the best mechanics I can for the best jobs, and men who are willing to do what they are told on the cheap jobs.

"I will tell you one good point that I have always lived up to, that is having a good foreman. Have a foreman on your nice job of finishing work that could do any part of it himself, but if you see him actually doing it fire him.

"I don't want a foreman on a big job of nice work that takes his coat off, for the reason that I hire him to think and direct. A foreman of a cheap job is not necessarily a first-class mechanic. He should be a man that knows how to lay out cheap work and pick men to work for him that are willing to work all of the nine hours each day. Not only this, but if he sees a man who is inclined to make an excuse to go away to smoke in working hours, as is often done, or takes ten minutes to go for a drink of water, he must be onto his job to fire that man before the rest of the gang and tell him why he is fired.

"You see it is this way. I believe in short hours, but I believe in work at the same time. When I first commenced to work at the trade we used to work anywhere from ten to fifteen hours a day, but the average man can expend all of his energy in nine hours if he will work, but if he works for me he has got to keep going all of that time.

"When I talked to you before I also told you that most of my success was due to the men who worked for me, and that is a fact, but, of course, I had something to do with the selecting of those men. I pay them the top wages and want the pick of the men. A man can't smoke on my time for the reason that no man can do two things at the same time and do both well.

"If a man can't go for four or five hours without smoking I don't want him. I would rather a man would not chew tobacco, but I don't draw the line so close on them unless he is too filthy in his habits. I expect I have the knack of getting more work out of men than any other contractor in the city."

"You are a great believer in luck, I should say, by the way you talk."

"I sure am. I have a nice little bank account now and don't owe a dollar. Ain't that luck for a carpenter-contractor, when so many of them are dragging their feet?"

"Do you know, Mr. Holebrook, I think you are a good deal of a hot air merchant when you talk about luck."

"Do you want to see my bank book?"

"No, I don't mean that way. I mean in regard to this talk you have been giving me about luck. You say you are lucky in securing good men, but it isn't luck. You select your men and you fire them if they don't come up to the standard that you have set. You say, yourself, you are on the job early and late, yet you lay your success to luck when in reality it is hard work combined with good judgment. Now tell me why you call it luck."

Mr. Holebrook smiled.

"I will tell you why I call it luck. I didn't invent that idea myself; my competitors call every success I have 'luck.' If I secure a good contract some of them say, 'He's a lucky cuss,' and if I rush a job through and get a bonus for doing it ahead of time some of my friends are always saying, 'Gee, but Joe is lucky,' and I have always been glad to have them think it was luck.

"When I come to think of it I believe I am making a mistake in telling you about this anyway, and I would just as soon you would not print it."

"I don't see what objection you can have to my printing it. It is a good story."

"That may be, but don't you know some of my competitors are liable to read it and wake up and give me a run for my money?"

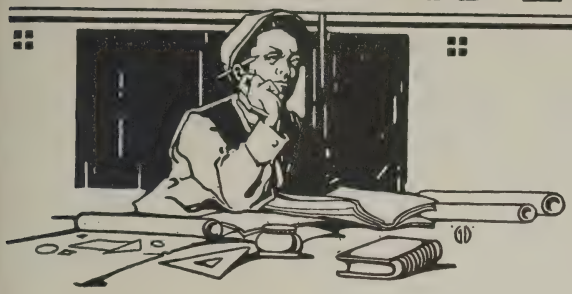
"Then you really don't believe in luck?"

"Oh, yes I do. I am a strong believer in it, but it is in every man's province to make his own luck. I have always noticed that the best luck always comes to the hustler—to the man who is willing to work when he gets a job, and when he can't get a job that suits him is willing to work at anything he can turn his hand to."

"Taking care of horses, for instance?"

"Yes, taking care of horses. I learned a lot taking care of horses that has helped me since, and my knowledge of carpenter work helped me to fix the stables so it was easier to take care of horses. I was lucky to get a chance to take care of horses. Oh, yes, I believe in luck, but I spell it W-O-R-K."

OUR READERS PAGES



[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Ed.]

Answers

STAIR BUILDING.

From "An Old Chip," Springfield, Mass.:

C. B., of Medina, Ohio, would find a great deal of solid information on stairbuilding in the reliable "Manuels" of the Art which may be easily obtained either through the office of the NATIONAL BUILDER, or through any other bookseller who deals in technical books. There are many of such books to be had, any of which give good instructions for building stairs. Perhaps one of the best is "Stairbuilding Made Easy," by Fred T. Hodgson. I mention this book because it is devoted entirely to the building of the bodies of stairs, and does not mix Handrailing with the instructions. If, however, C. B. desires to include Handrailing in his work, he will be obliged to get larger and more expensive works, of which there are any number to be had; one of which is a new, and apparently a very easily understood treatise, showing a new and complete system of obtaining handrails, without using tangents or other complicated lines. The book is by C. C. Grant, M. D., and costs but one dollar. There are, of course, many other books, and other systems for getting lines for handrailing, but this is worth trying.

HORSE VS. ENGINE POWER.

From "Carpenter," Philadelphia, Pa.:

"Small Contractor," of Manitowoc, Wis., had better buy a small steam engine to do his hoisting with. He will find it handier and more obedient than a horse, and it will want but little attention. No contractor nowadays, who wants to keep up with the "procession," makes use of horsepower to raise material to the upper stories. The difference in the cost of employing horse or steam power, has been found to be from 15 to 30 per cent in favor of steam—and sometimes even greater.

WIRE NAILS VS. CUT NAILS.

From "Old Woodworker," Hartford, Conn.:

I might say to Jas. S. L., of Oswego, that carpenters as a rule prefer wire nails to use, because they are cleaner and nicer to handle, and in many cases are just as efficient as cut nails in the same position. They do not hold so well, perhaps, as cut nails, but, as they drive easily, the defect is made up by the use of more nails. The greatest objection to using wire nails lies in the fact that it is generally believed, and with some reason, too, wire nails rust and rot off, much more quickly than cut nails do, when used for shingling or similar purposes. Wire nails rust much more quickly in any position than do cut nails, owing, perhaps, to the fact that cut nails are more or less oxidized when being made. Of course, both kinds will rust in time, and this should lead to a more extensive use of galvanized nails which are rustless and cost but a trifle more than either wire or cut nails, and they possess all the good qualities of both, being clean, easy to drive, and quite as effective as either.

CORNICE.

From "Draftsman," Hoboken, N. J.:

Just a few words to say to J. E. J., of Hartford. The Moulding P. A. O. X., in your illustration shown last month, is all right as it is shown, with X showing as the lowest member with the "Ogee" at A as the supporting member of the bed-mould.

VALLEY RAFTERS FOR TWO-PITCH ROOFS.

Answering W. H. I., Knoxville, Tenn., by Pallas Brothers:

The question asked in September, as to how to cut valley rafters for two-pitch roofs, and to this we would say with a saw, but what would first be required is how to lay them out and assume this is the information that W. H. I. desires to obtain. For the same we send sketch and explain.

Fig. 1 shows the height to ridge as 11 feet 6 inches. Fig. 2 shows the height to ridge as 6 feet. Fig. 3 is the outline of plate. The dotted line from C to D shows where the ridge running level on the low pitch roof would strike the other roof at C. Dropping a line straight down from C to B shows the distance from the plate over or the measurement given by us as 7 feet 4½ inches shown from A to B and also the same measurement from I to H in Fig. 3. The dotted line from H to J is continued up from the line C and B. F shows where the ridge of the low pitch roof meets this line. The line E and F is the line running level underneath the valley and shows the angle that the valley follows. Square off from the line E and F at F a distance of 6 feet which is the rise of the low

FIG 3

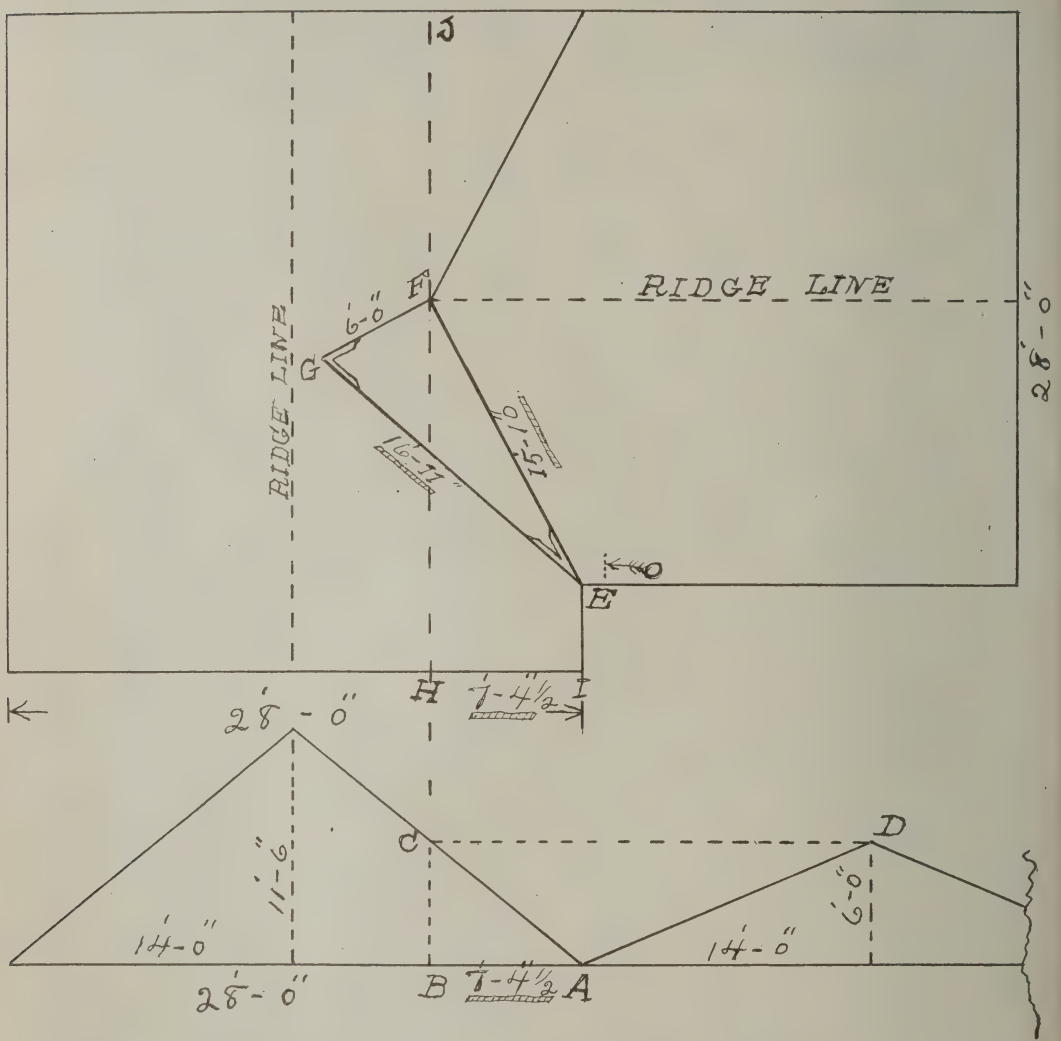


FIG 1

FIG 2

pitch and is shown at G and F. A line drawn from G to E would be the length of the valley rafter, which is 16 feet 11 inches. The angle at G would be for the top cut and the angle at E for the bottom cut on the plate.

Measurements supplied by us are underlined although may not be correct as the scale is too small for detail work, but is only to show how the same can be obtained.

We have above explained the laying out of a valley rafter to fit this plan but beg to advise that if the cornice on the building is desired to run around on a level and to be of the same width much more figuring is first required.

Strange as it may appear to one not familiar with roof work is that the valley would not start at E in Fig. 3, but a few inches over towards O. We being able to explain this will do so should we ever see the question asked.

VALLEY RAFTERS FOR TWO-PITCH ROOF.

From J. T. in answer to W. H. I., Knoxville, Tenn.:

If W. H. I., Knoxville, Tenn., who inquires in the September number of the NATIONAL BUILDER concerning valley rafters for two-pitch roof, will consider the problem as an irregular hip, I think he will find its solution very easy. The sketches herewith submitted show the treatment of the subject from that viewpoint. In Fig. 1, that part considered as the annex and so marked, is shown as a parallelogram, and it is readily obvious that whatever would fit as a hip rafter would also fit as a valley rafter, as the length and pitch of each is identical.

Now, it will be noticed that in working plan Fig. 2, there are two lines designated "Hip." The dotted line marked X connecting them at their upper end show them to be the same length. They in reality represent just one hip, but remember this is an irregular hip, and must be shown in the two positions indicated in the "working" plan, Fig. 2, in order that the side cuts and length of both the end and side jack rafters may be

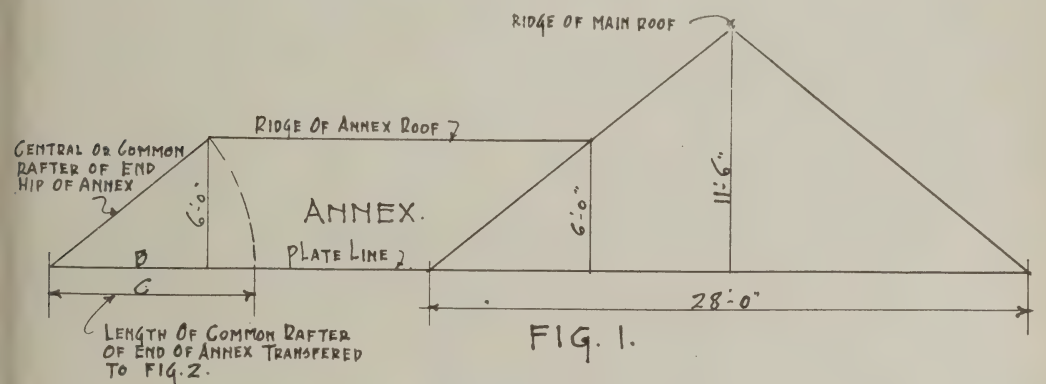


FIG. 1.

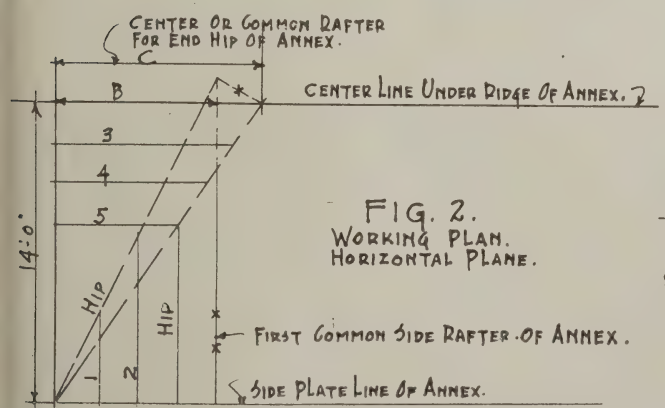


FIG. 2.
WORKING PLAN.
HORIZONTAL PLANE.

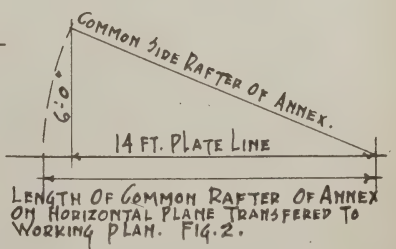

COMMON SIDE RAFTER OF ANNEX.
6'-0"
14 FT. PLATE LINE
LENGTH OF COMMON RAFTER OF ANNEX ON HORIZONTAL PLANE TRANSFERED TO WORKING PLAN. FIG. 2.

FIG. 3.

obtained. The lines in Fig. 2, marked 1 and 2, show the side jacks, the lines marked 3, 4 and 5, show end jack rafters, and their side cuts are readily seen. It is not meant that the annex must have a hipped end at all, but such is merely assumed for convenience, simply because it appears easier to the writer to illustrate and explain it as a hip, and as heretofore remarked, the same measurements apply to either end of the annex considered as a parallelogram. In other words, the lines marked "Hip" transferred to the opposite end of the annex would become valley rafters, while the jacks would become "cripples," nor would their lengths nor bevels be changed other than both sides of each jack would be an independent r allelogram uniform in shape, but one side owing to the side bevel required for the bottom or valley rafter end would, of course, be shorter.

It is understood, of course, that if the hips and jacks as shown in Fig. 2 were transferred to position of valleys and cripples, the jack rafters marked 3, 4 and 5 would be on the opposite side and their length increased sufficient to reach from the valley to the ridge or comb of main roof, but neither their sides bevel nor plumb cut would be changed. The jack rafters marked 1 and 2 would, of course, also become valley rafters, and reach from the valley to ridge or comb of annex.

The side cuts or bevel of the jack rafters as shown in working plan, Fig. 2, would fit the valley rafter as a cripple just as they would fit the hip as a jack. The top cut of cripples, as of jacks, are, as every carpenter knows, just the same as the common rafter. To epitomize, the problem resolves itself into a simple reversal.

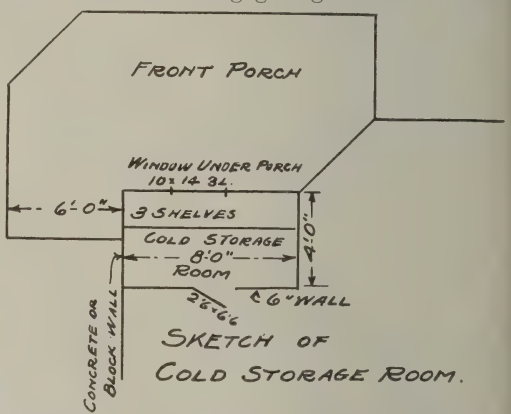
CUT NAILS VS. WIRE NAILS.

From A. M. R., Plainville, Ct., in reply to J. S. L., Oswego, N. Y.:

Wire nails are much cleaner, easier to handle and drive than cut nails; as to holding power when first laid, they are perhaps equal, but on taking off any roof where they have been used, it will be observed that where the nail was driven, and for a considerable distance around it, the roof is all rotted away, while the rest of the shingle is in good condition—but not so with your cut nails. Why? Chemists tell us that there is an acid formed from the rust of the wire nail which corrodes and soon causes the wood to rot away in the immediate vicinity of the nail much quicker with the wire than the cut nail. I have used both, but am now using a high-grade galvanized wire nail and have had no complaints from them, and like them much better than the cut nails. The great objection with the wire nails has been their rusting so quickly.

From A. E. F., Hutchinson, Kans.:

Will some reader of the NATIONAL BUILDER please inform me how to erect a cold storage room in a basement? I would like to see a drawing giving section of wall.



What would be the best material to build it out of? Would 6-inch concrete walls on the inside be heavy enough and would that be the cheapest? I enclose sketch showing location of storage room, also size. Is there anything else just as good but cheaper than concrete that can be used for the walls.

PLASTERING.

From "Builder," Middletown, N. Y.:

One would think that Wm. G. of Chicago would know all about plastering and contracting, living, as he says he does, in one of the livest cities on earth, where contracting has been reduced to a science. However, we may live in the Garden of Eden, or in the other place, and be so busy that we may not take note of either the joys or the punishments that are going on about us, and this may be the case with Wm. G. (happy fellow), so I will try and help him a little.

First, know your business. This is important. If you have money enough to pay cash for your stock—lime, lath, hair and other necessary materials—and a portion of the wages of your men, you will have capital enough to give you a good start, for as soon

as you get the material on the ground, and a good start on the work, the architect will give you an opportunity to draw on the owner for a fair percentage of your outlay, or you may be able to make arrangements with some bank to have money advanced you to pay your men. Figure on the work by the yard, when you estimate, then you can tender for the work at so much a yard, or give in a bulk tender, the amount of which will be governed by the number of yards in the whole work, and which you must obtain by a careful measurement of the plan from which correct quantities can be taken. After you have decided as to the amount in bulk, or per yard, for which you will do the work, then send in, or submit, the figures to the architect or owner. This is a simple matter. All you have to do is to say that:

"I do hereby agree to do all the plastering on your building, which is being erected on lot No. . . ., Thirty-fifth street, in accordance with the conditions named in the specifications prepared by John Doe, architect, for the sum of $1,550, for the whole work, or 35 cents per superficial yard. Cornices, and extra plaster work to be charged extra as may be agreed upon.

"Richard Roe, Plasterer, etc."

This form, of course, is only a rough form of tender. If you buy a good work on estimating, you will find regular legal forms in them which will guide you all right.

SAFE LOAD ON PILE.

From F. C. N., Calgary, Alta., replying to W. T. W., Calgary, Alta.:

I can give a formula which he can use to good advantage. You might also say that he could get a good deal more information on the subject by attending the Calgary Evening Technical School on Tuesday evenings, subject, "Applied Mechanics." Instructor J. M. Hutchinson, B. A.

The safe load that may be supported on a pile can be ascertained by the ordinary formula:

D=Distance driven by last blow in inches (assume ½ inch).

H=Height fallen through by ram in inches (assume 72 inches).

W=Weight of ram in cuts (assume 15 cwt.).

$$\text{Safe load in cwt.} = \frac{WH}{8D} = \frac{15x72}{8x05} =$$

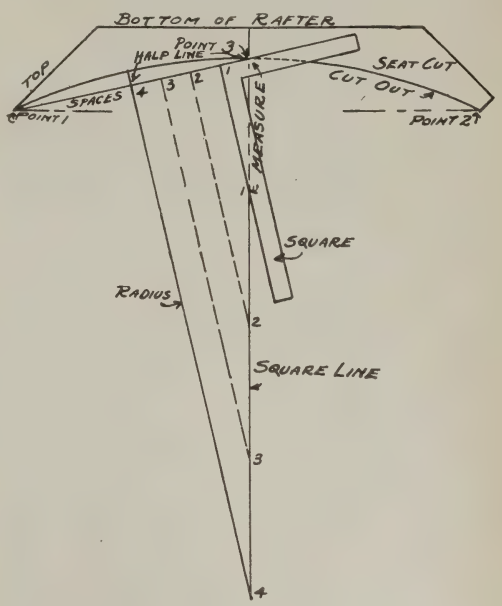
270 cwt. = 13½ tons.

CONCAVE RAFTER—A CORRECTION.

A. A. STAFFORD.

In the October number of the NATIONAL BUILDER there is an error and this article with the cut, will make my method of obtaining a concave rafter clearer.

In place of 12 inches being multiplied for length of radius, it should be the distance where this drawing says "measure" multi-



plied by reading on tongue of square, Fig. 13. By this drawing you can establish figures either way. Slide square on ½ line for convenient spaces, any number of them. To work this problem, take a good straight edge pattern, establish points 1 and 2 by run and rise, establish point 3 half way, and by the concave you want in roof. Make square line at point 3 and draw line from point 1 to 3. Take one-half the length of this line for spaces, more or less, so as to get large work in small scale. For example, suppose this sketch was a full size detail. One-half line 2 ft. long. Square laying 6″ at point 3. The blade could be 28″ where it cuts square line. The measure as indicated would be $28\frac{11}{16}$. This multiplied by four spaces, 4 in. 2 ft., equals 114¾″, divided by 12″ for feet—result, 9 ft., 6¾″ for length of radius for this particular curve. Changing curves changes all the figures, but does not change the principle.

Questions

ROPE MANIPULATION.

From W. H. I., Knoxville, Tenn.:

I wish to know how to learn from some source all kinds of rope manipulation, such as tying all kinds of knots, hitches, slings, etc. Also, how to rig up all kinds of derricks, etc., also the carrying capacity of all sizes and kinds of rope splices, etc.

SCALING OF CEMENT PLASTER.

From W. N. P., Chateaugay, N. Y.:

I plastered a house and put cement in the lime mortar and then put on a hard finish of lime and plaster paris, which I often do, and it is scaling off very bad. Can you tell me the reason for its peeling off? Is it the cement in the mortar that causes it?

SKETCHES WANTED.

From E. B., Cross Plains, Wis.:

I wish you would urge the readers of the NATIONAL BUILDER to send in sketches and illustrations of carpentry work, i. e., a china closet, a pantry or bookcase, etc. I think it would benefit the readers a great deal and would enlarge and better the NATIONAL BUILDER, which is already a good magazine.

QUESTIONS.

From "Wm. B. S.," Atlantic City.:

I would like if some reader would inform me how hollow concrete block compare in durability with bricks, stone, or stucco—or roughcast buildings?

LADDER.

From "Young Chap," Dayton, Ohio.:

To settle a dispute will some reader who knows publish in this column, what distance the "rungs" of an ordinary ladder should be apart?

DAMP FLOOR IN BASEMENT.

From "J. H. P.," Cleveland, Ohio.:

I write to inquire if you or some reader, will be good enough to inform me if there has been anything written to show how to construct a basement floor in such a way as to prevent condensation of the atmosphere in the basement, or the capillary attraction through the basement floor, especially where the excavation has been made out of rock or shale formation? I find that a number of my neighbors are having trouble with "sweaty" basements, and the best explanation I have heard of it is that the stone beneath the floor of the basement retains the cold to such an extent that the warm air coming in from the outside condenses and a wet floor is the result. Just how to construct a floor in such a way as to prevent this, is the cause of my inquiry. I find that even architects disagree. One advises me to use plenty of cinders before putting on the cement, while another says that hollow tile beneath the cement would make an air space and thus arrest the cold air from beneath. I have had drain tile placed all around outside the foundation lower than the footing stones, and am told that this will help much?

I shall be very grateful for any information you might see fit to give me, or the title of any book to which you might refer me.

STEEL SQUARES.

From "Moses R.," Milwaukee, Wis.:

I am in need of a steel square, as I am gathering up a new outfit, having lost my old "kit" by fire, and wish to have the new tools the best of the kind, so take it upon myself to ask "Mr. Hodgson"—or any other person who knows, what make of a Steel Square is the best? Information on this point will be thankfully received.

DRAIN-TESTING BY OFFICIALS.

From "Suburbs," Utica, N. Y.:

If I put in a water-closet and a new manhole on an existing surface water drain without getting permission from the sanitary authority, is it the duty of this authority to test the old drain?

PROBLEMS OF A BEGINNER.

From R. T. W., Charleston, S. C.:

What is the safest method of estimating the cost of carpentry labor?

What is a fair margin for a contractor's profit?

What would you advise a beginner in the contracting and building business to do in a city where he is not known in order to secure work? How should he start about the business?

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Book Notices

Notice.—All books noticed in these columns may be obtained from this office at Publishers' prices. All postage or express prepaid. (Money and address must accompany all orders.)

THE ELECTRICAL BLUE BOOK.—The 1912 Electrical Blue Book is a handsome publication of 206 pages, containing a comprehensive exhibit of officially approved electrical supplies, to which is added an illustrated list of other representative lines of electrical material. A feature which makes this book especially valuable to every user of electrical material is the National Electrical Code, the rules and requirements of the National Board of Fire Underwriters for electrical wiring and apparatus as recommended by the National Fire Protection Association. The Code rules are explained in detail and the many illustrations bring out in a most understandable manner the correct interpretation of the installation rules. A complete index makes each rule and section easily discovered. The list of approved fittings is unusually comprehensive and is brought up to May 1, 1912. The illustrated exhibits of the manufacturers of electrical material, together with the other essentially valuable contents of this publication, make it of unique value to the buyer of electrical apparatus and supplies. The book measures 9 by 12 inches, is bound in substantial stiff cloth covers and will undoubtedly be preserved and used as a convenient book of reference by all recipients. Each book is carefully packed in a strong, paper carton. Supplied by the Electrical Review Publishing Company, Chicago, at $2.00 per copy.

SUCCESSFUL HOUSES AND HOW TO BUILD THEM.—By Chas. E. White, Jr., M. A. I. A., author of "Some Western Houses," "Satisfactory Types of Garages," etc., etc. Drawings by the author. Published by The MacMillan Company, New York, 1912, 512 pages. Illustrated with several hundred photo-engravings, diagrams, tables and line drawings. Bound substantially in cloth. Price, post paid, $2. For the laity this book must prove a veritable treasure and professional architects, builders or other persons engaged in a professional way, in "Building Construction," much handy information may be gathered put up in such a form and arranged in such a manner that little time will be lost in looking up any particular wanted. It contains a copious index, and the whole work is gotten up in a neat and creditable manner. Perhaps a few words taken from the author's introduction will convey to the reader a general idea of the scope of the work. He says: It is written from the standpoint of the house owner, and covers authoritatively and completely the entire field of building houses, large and small. From the very beginning, even to the purchase of the site and the giving of contracts, every factor bearing on the erection and equipment of a successful house is treated—the various building materials, ideal arrangements of rooms, the different kinds of heating, ventilating and lighting systems, decorating inside, painting without, in fact every detail of the subject. And not only to one type of house but to all is this consideration devoted—city houses, town, country and farm houses, suburban houses and bungalows, camps, cottages, garages, barns and greenhouses. There are also several chapters on outdoor accessories, such as terraces, walls, banks, sidewalks and pergolas.

PRACTICAL STEAM AND HOT WATER HEATING AND VENTILATION.—By Alfred G. King, author of "Practical Heating" and other works of a similar nature. The new work being a thoroughly practical one on steam and hot water heating and ventilation with descriptions and data of all materials and appliances used in the construction of such apparatus, rules, tables, etc. It is well bound and well printed on fine strong paper and contains over 400 pages and 300 specially-made illustrations showing in detail all of the various heating systems with pipe, radiator and boiler connections and data for estimating. Published by The Norman W. Henley Publishing Co., 132 Nassau street, New York. Price, prepaid, $3.

This book is one of the best of its kind that has ever been brought to our notice. We have gone through it with care and the more we examined it, the more we were impressed with its thoroughness and real practical usefulness. The easy style, and the plain understandable language made use of by the author, must go far to make the work acceptable to the ordinary worker. The simplicity and clearness of the diagrams and illustrations and the accompanying descriptions add greatly to the value of the work. The various systems of heating are shown and explained, rules for estimating the cost of these systems and for taking all measurements of piping, and showing how to calculate for heating surface in piping or radiators of all kinds and for their proper distribution. The chapters on ventilation are most valuable and will prove very helpful to every one who either designs or constructs appliances or devises channels for the transmission of air, along with much other information on this vexed question. Indeed the book is a standard, and is the latest work published on the subject and has been prepared for the use of all engaged in the business of steam, hot water heating and ventilation. It is an original and exhaustive work. Tells how to get heating contracts, how to install heating and ventilating apparatus, the best business methods to be used, with "Tricks of the Trade" for shop use, rules and data for estimating radiation, and cost and such tables

and information as make it an indispensable work for everyone interested in steam, hot water heating and ventilation.

All technical matter too dense for the man of average education to clearly understand, has been eliminated and the author has, in a breezy, entertaining and yet simple manner, described all the principal systems of steam, hot water, vacuum, vapor and vacuum-vapor heating, together with the new accelerated systems of hot water circulation, including chapters on up-to-date methods of ventilation, also the fan, or blower system of heating, and ventilation.

A new book just published by the International Text-Book Company, Scranton, Pa., bearing the title of "Shades and Shadows," by Prof. William Ware, is deserving the consideration of all draftsmen and designers, and more particularly of those engaged in Architectural and decorative work. Works published by this company may be depended upon as being practical and reliable, and when the writers have a high-class reputation similar to Prof. Ware, the works become doubly valuable. Shades and Shadows, is issued in two parts. Part I, consists of five chapters treating of the phenomena of light and shade and the methods to be adopted in the solution of the geometrical problems that arise from their architectural representation. Part 1 is intended to familiarize the student with these methods, and accustom him to think in terms of three dimensions, thereby simplifying the study of Part 2, which treats of more complex problems.

Following the several problems are architectural examples showing the application of each problem in some practical way, thus enabling the student from the beginning to understand the practical application of each process. Shades and Shadows, Part 2, consists of eight chapters in which are discussed the shades and shadows of curved lines, of solids, of revolutions, including cylinders, cones, spheres, etc., and combinations of these figures that occur in architectural detail.

In an appendix a short treatise on projection, perspective and trigonometrical terms is added for the convenience of the student not thoroughly familiar with these details. This work on Shades and Shadows is based upon notes made by Prof. Ware during his 20 years' experience at the head of the Architectural Department of Massachusetts Institute of Technology and Columbia University. The books are bound in quarto volumes, uniform with the American Vignola by the same author, and are sold at $2.50 per part.

Patents

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

1,039,895. Wm. H. Burk, Assor., Corrugated Bar Co., St. Louis, Mo.

1,039,720. Door Hanger, L. E. Fournier, Boston, Mass.

1,039,846. Floor Connection. H. W. Thorndike, Assor. F. W. Webb Mfg. Co., Boston, Mass.

1,040,504. Door opening and closing device. H. C. Bundy, Assor. two-thirds, F. Morrison and E. Pinsonnealt, Watertown, N. Y.

1,040,505. Burglar proof door fastener. F. Buskirk, New York city.

1,040,880. Door operating mechanism. G. M. Cameron, Rochester, N. Y.

1,040,887. Door stop and holder. J. H. Coffman, Philadelphia, Penna.

1,040,683. Door closer. J. D. Humphrey, Assor. one-half. J. M. Brady, New Britain, and E. C. Halliday, Hartford, Conn.

1,040,355. Metallic weather-strip. L. Knott, Altoona, Penna.

1,040,746. Iron frame for windows. A. Packscher, Berlin, Germany.

1,040,817. Door operating mechanism. T. H. Tutwiler and A. D. McWhorter, Memphis, Tenn.

1,040,965. Combined floor check and hinge. H. G. Voight, New Britain, Conn.

1,040,966. Lock. H. G. Voight, New Britain, Conn.

1,040,967. Lock for sliding doors. H. G. Voight, New Britain, Conn.

1,040,968. Spring floor hinge. H. G. Voight, New Britain, Conn.

1,040,969. Door controlling and locking means. H. G. Voight, New Britain, Conn.

1,040,970. Door controlling and locking means. A. G. Voight, New Britain, Conn.

1,040,474. Water closet. E. G. Watrous, Chicago, Ill.

1,041,430. Door check. E. W. Clark, St. Petersburg, Fla.

1,041,245. Building construction. L. K. Davis, New York city.

1,041,342. Combined connecting brace, etc., for water closet seats. Chas. Pfau, Assor. The Pfau Mfg. Co., Norwood, Ohio.

1,041,704. Lock for sliding doors. H. G. Voight, New Britain, Conn.

1,041,705. Door controlling means. H. G. Voight, New Britain, Conn.

1,041,706. Door controlling means. H. G. Voight, New Britain, Conn.

1,041,389. Concrete wall construction. E. F. Wiederholdt, St. Louis, Mo.

1,041,551. Apparatus for molding concrete staircases. Chas. H. Witthoefft Assor. Witthoefft Collapsible Concrete Forms Co., St. Louis, Mo.

Trade Marks.

88,659. Roofing felts and papers. Barrett Mfg. Co., New York city.

88,665. Building contract documents. Chicago Architects' Business Association, Chicago, Ill.

88,680. Certain construction materials. Wm. B. Hough Co., Chicago, Ill.

LEGAL DECISIONS

OF INTEREST TO BUILDERS

Prepared for the
NATIONAL BUILDER
by George H. Murdock

The workmen's compensation law (Laws 1911, c. 50), providing a method for compensation to injured employes, is not unconstitutional as a deprivation of property without due process of law.—Borgnis v. Falk Co., 133 N. W. (Wis.) 209.

Under Rev. St. c. 93, § 29, giving a lien for materials furnished in erecting, etc., a building, one is not entitled to a lien for materials furnished, but not used in the construction of the building against which lien is sought.—Fletcher-Crowell Co. v. Chevalier, 81 A. (Me.) 578.

Under Rev. St. c. 93, § 29, giving a lien for material furnished for a building, one is entitled to a lien for iron columns set in the building, but afterwards taken out at the owner"s order on revision of the plans.—Fletcher-Crowell Co. v. Chevalier, 81 A. (Me.) 578.

To entitle the holder of a mortgage upon premises covered by a mechanic's lien to be made a party to a suit to enforce such lien, it is not enough that the plaintiff have notice of the existence of such mortgage at the time of the commencement of such suit. The mortgage must then have been "of record."—Conlan v. Leonard, 81 A. (N. J.) 492.

Where a conditional sale contract of articles which are fixtures, and consequently realty, save for the reservation of title in the seller until the price is paid, was not recorded until lienors had furnished materials and labor, the liens included such articles; the lienors having a right to rely on the apparent character of the property as realty.—Fulp & Linville v. Kernersville Light & Power Company, 72 A. (N. C.) 867.

The workmen's compensation law (Laws 1911, c. 50) is not unconstitutional, as depriving employers who do not elect to accept the act of the defenses of assumed risk and fellow servant in actions for injuries to employes, since such defenses, having been evolved by the courts, could properly be withdrawn by the Legislature, without reference to whether the business with reference to which the withdrawal was applicable was hazardous or nonhazardous.—Borgnis v. Falk, 133 N. W. (Wis.) 209.

A builder ordered by the proprietor to do work in some way connected with the original contract, but substantially independent of it, under such circumstances that the owner should know that the execution of her orders will cause extra trouble and expense to the builder not contemplated by the terms of the contract to build, has a just demand for reasonable compensation for the extras if the original contract does not provide to the contrary.—Sabin v. Cameron, 133 N. W. (Neb.) 422.

Where a building contractor substantially completed the building, and the owner accepted and occupied it, and the architect refused to ascertain the amount the owner was entitled to as deductions for items for departures from the contract, and the amount of the items for which the contractor was entitled to recover as extras, the refusal of the architect was wrongful, and the contractor could recover on the contract the amount due him.—Corse v. Linke, 133 N. W. (Wis.) 598.

When a school district, through its board, contracts for the erection of a building, and one of the board directs the basement to be made lower than called for by the plans and specifications assenting to a suggestion by the workman that such work will have to be paid for, and the different members of the board are upon the work from day to day overseeing and watching the same, and the building so deepened is accepted and used for a year or more by the district for school purposes, held, that the district is liable for the reasonable value of such extra work, although no contract was made therefor by the board in session.—Watkins v. School Dist. No. 104, Crawford County, 118 P. (Kans.) 1069.

A contractor for the construction of a mill according to plans and specifications prepared by the employer, who furnishes labor and materials and exercised control as to the method of the work, but who is to increase his force to complete the work within a certain time if required by the engineer of the employer on penalty of foreiture of his contract, whose compensation is determined by estimates made by the engineer, and who is required to do the work in full accordant with the directions and instructions of the engineer on penalty of a forfeiture of his contract, is an independent contractor, for whose negligence, resulting in the death of an employe, the principal employer is not liable.—Hopper v. S. S. Ordway & Sons, 72 S. E. (N. C.) 839.

Building Material Price List

Revised to Date.

*Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red Cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

Dimensions,	Seattle, Wash., Corrected by F. T. Bradley. M ft. BM	Chicago, Corrected by J.H. Touchstone. M ft. BM S 2 S	Omaha, Neb., Corrected by I. P. Hicks. M ft. BM S 2 S	Southern Ontario, Corrected by F. O. Frantz. M ft. BM S 2 S
2"x4" to 8" up to 16', No. 1	$11.00	$24.00	yp $26.00	h $26.00
2"x4" to 8" up to 16', No. 2		22.00	24.00	22.00
2"x4" to 8" 18 and 20', No. 1		26.00	27.00	26.00
2"x10" up to 16', No. 1	12.00	26.00	28.00	24.00
2"x12" up to 16', No. 1		28.00	30.00	25.00
2"x14" up to 16', No. 1	12.50	30.00	*	26.00
Each 2 ft. over 20 ft., add per M		1.00	1.00	2.00
Select stock as above, add per M	6.00	5.00	*	*
Exterior Finish, Etc.—		M ft. BM D 4 S	M ft. BM D 4 S	M ft. BM D 4 S
1"x8", to 1"x8", No. 1	30.00	yp $32.00	yp $45.00	wp $35.00
1"x16", No. 1	39.00	37.00	43.00	40.00
1"x12", No. 1	35.00	35.00	46.00	42.00
1¼"x8" to 1¼"x12", No. 1		45.00	48.00	45.00
1½" and 2" same as above		42.00	48.00	42.00
1" drop siding, No. 1	25.00	24.00	30.00	30.00
½" lap siding, No. 1 cedar	25.00	28.00	rdw 30.00	30.00
Enclosing and Fence Boards—		M ft. BM S 1 S	M ft. BM S 1 S	M ft. BM S 1 S
1"x4" to 1"x8", No. 1		yp $26.00	yp $25.00	wp $30.00
1"x8" to 1"x12", No. 1	11.00	29.00	24.00	h 24.00
1"x16", No. 1		*	24.00	24.00
1"x16", No. 2	15.00	*	22.00	22.00
Interior Finish, Flooring, Ceiling, Etc.—		M ft. BM D S	M ft. BM D 4 S	M ft. BM D 4 S
½"x⅞", T. & G. Flooring, No. 1	30.00	yp $30.00	yp $38.00	wp $40.00
½", T. & G. Flooring, No. 2	27.00	*	34.00	wp 30.00
Ceiling per M	25.00	1.00	2.00	1.00
Partition per M	30.00	2.00	2.00	2.00
⅝"x4" Ceiling No 1	17.00	27.00	30.00	np 30.00
		100 ft. run	100 ft. run	100 ft. run
4¼" Moulded Casing	.02	yp $1.75	yp $2.00	wp $2.00
4¾" Moulded Casing	.02½	2.00	2.50	2.50
7¼" Moulded Base	.03	3.00	3.50	4.50
½"x9¼" Moulded Base		4.00	4.00	6.00
1½"x4½" Moulded Window Stool	.02½	2.50	3.00	4.00
Miscellaneous List—		Per M	Per M	Per M
Shingles, No. 1		rc $3.75	$4.00	bc rc $3.75
Shingles, No. 2		3.75	3.75	*
Shingles, fancy		W. C.	4.50	6.00
Lath, 4 ft., No. 1		yp 3.60	y 5.50	wp 5.00
Lath, 4 ft., No. 2		2.75	5.00	s 3.75
Pickets, 1"x3"x4' 6", dressed		35.00	30.00	*
Pickets, 1"x3"x4' 6", rough		*	*	*
		Piece	Piece	Piece
6"x8' Post split		Cdr $0.13	Cdr $0.25	*
8"x8' Post split		.17	.30	*
8"x8' Post whole		.66	.40	Cdr $0.30
6"x8' Post whole		.25	.35	.25
Hardware List—		Cw.	Cwt.	Cwt.
Nails, wire, common		$2.25	$3.00	$2.85
Nails, cut, common		2.10	*	3.00
Nails, wire, fine finishing		2.65	3.50	4.00
Sash Weights, cast iron		1.60	1.50	2.25
Tarred Felt Paper, best 2-ply		Roll $1.00	Roll $1.00	Roll 1.25
Tarred Felt Paper, 3-ply			1.25	1.50
Red Rosin, Atlas brand			.90	.50
Red Rosin, durable brand			.75	.60
Black Neponset			*	2.50
Masons' Supplies—		Per M	Per M	Per M
Brick, blue, at kilns		*	*	*
Brick, blue, at kilns, No.		*	*	*
Brick, blue, at kilns, No. 2		$7.50	*	
Brick, white, delivered, face		7.00	*	*
Brick, red, delivered, backing		7.00	7.50	*
Brick, delivered, dry pressed		18.00	18.00	$17.00
Brick, vitrified, dry pressed		*	24.00	*
Lime, best gray		bbl. $1.30	bbl. $1.25	bbl. *
Lime, best white		1.40	1.25	*
Cement, Portland		.95	1.85	bbl. 1.80
Plaster, calcined		2.40	1.80	bbl. 2.50
Hair, 8 lb. per bush		.25	.25	*

NOTE—While these figures are approximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

New York Prices for Lumber

	SPRUCE	L. L. Y. P.	S. L. Y. P.
2x2—2 x2½—2x3 2x4—2½x4 —3x4	Average price.....$29.00	.....$32.00	.....$26.00
2x6—2x7—2x8 3x6—3x7—3x8 4x6—4x8	19 feet and under.. 32.00 Over 19 feet..... 34.00	Up to 28 feet.. 32.00	Up to 28 feet.. 29.00
2x9—2x10—2x12 3x9—3x10—3x12	19 feet and over.. 34.00 Over 19 feet..... 37.00		
2x9—2x10 3x9—3x10 4x9—4x10		Up to 28 feet.. 35.00	Up to 28 feet.. 31.00
2x12— 4x12 3x12— 6x12 8x12—10x12—12x12		Up to 28 feet.. 40.00	Up to 28 feet.. 34.00
14-inch		Up to 28 feet.. 45.00	Up to 28 feet.. 40.00
16-inch		Up to 28 feet.. 50.00	
"Squares" (6x6—6x8—8x8—8x10—10x10)		Up to 28 feet.. 33.00	Up to 28 feet.. 30.00

⅞-in. and 1⅛-in. white pine cornice, sound knotted..... 55.00
⅞-in. and 1⅛-in. cypress cornice, clear..... 60.00
⅞-in. and 1⅛-in. cypress cornice, select..... 50.00
6-in. red cedar or redwood bevel siding, clear, 8 to 16 feet..... 30.00
6-in. white pine, clear, 12 to 16 feet..... 45.00
6-in. white pine, No. 2, 12 to 16 feet..... 40.00

ROOFING, T. & G., SHIP-LAP OR SQUARE EDGE.

⅞x5½-in. face, N. C. pine, 10 to 16 feet 25.00
⅞x7½-in. face, N. C. pine, 10 to 16 feet 26.00
⅞x9½-in. face, N. C. pine, 10 to 16 feet 27.00
1⅛x5½-in. face, N. C. pine, 10 to 16 feet 26.00
⅞x5½ to 7½-in. spruce 28.00
⅞x5½ to 7½-in. Hemlock 27.00

FLOORING.

¾x2½ to 4½-in. N. C. pine, or yellow pine, flat grain, No. 1, 10 to 16 feet..... 33.00
¾x2½ to 4½-in. N. C. pine, or yellor pine, flat grain, No. 2, 10 to 16 feet..... 28.00
¾x2½ to 4½-in. N. C. pine, or yellow pine, flat grain, No. 3, 10 to 16 feet..... 22.00
⅞x2½-in. N. C. pine, comb grain, No. 1, 10 to 16 feet 47.00
⅞x2½-in. N. C. pine, comb grain, No. 2, 10 to 16 ft. 40.00
⅞x2½-in. yellow pine, comb grain, "A Heart," 10 to 16 feet..... 65.00
⅞x2½-in. yellow pine, comb grain, "A Sap," 10 to 16 feet 48.00
⅞-in. maple flooring, 2 feet and up, clear 50.00
⅞-in. maple flooring, 2 feet and up, No. 1 ..... 45.00
⅞-in. plain oak flooring, 2 feet and up, clear 65.00
⅞-in. plain oak flooring, 2 feet and up, selects 56.00
⅞-in. quartered oak flooring, 2 feet and up, clear..... 105.00

SHINGLES.

18-in. red cedar, "Eureka" 5.75
18-in. red cedar, "Perfection" 6.25
18-in. white cedar, XXXX 7.00
18-in. white cedar, clear butt 6.00
16-in. white cedar, extra 5.50
16-in. white cedar, clear butt 5.00
6x18-in. cypress, No. 1, Heart (on 6-in. basis)..... 11.00
6x18-in. cypress, No. 1, Sap or "A" (on 6-in. basis)..... 9.00
6x20-in. cypress, No. 1, Heart (on 6-in. basis)..... 14.00
6x20-in. silver gray cedar, No. 1 (on 6-in. basis)..... 18.00
6x20-in. silver gray cedar, "A" (on 6-in. basis)..... 15.00
6x20-in. silver gray cedar, Star (on 6-in. basis)..... 12.00

CEILING.

½-in. N. C. pine ceiling, clear, one side, 10 to 16 feet..... 27.00
½-in. N. C. pine ceiling, No. 2, one side, 10 to 16 feet..... 24.00
⅝-in. N. C. pine ceiling, clear, one side, 10 to 16 feet..... 24.00
⅞-in. N. C. pine ceiling, clear, one side, 10 to 16 feet..... 35.00
⅝-in. N. C. pine ceiling, clear, two sides, 10 to 16 feet..... 37.50
1⅛-in. N. C. pine ceiling, clear, one side, 10 to 16 feet..... 37.50
1⅛-in. N. C. pine ceiling, clear, two sides, 10 to 16 feet..... 40.00

	CYP.	Y. P.	W. P.
4¼-in. moulded casing	$2.75	$2.25	$3.30
4¾-in. moulded base	3.00	2.50	3.75

NOTE.—These prices are for less than car lots delivered on the job, within reasonable limits in New York, Brooklyn and the adjoining districts.

Trade Review

The various trade mentions which have appeared from time to time in these columns have been written by the editorial staff of the National Builder for the benefit of our subscribers. We have found that our readers are interested in the descriptions of new materials, machinery, tools and other apparatus used in building construction.

The changes taking place from time to time in the building field should be brought to the attention of our readers, to keep them posted on the general business advance, that they may take advantage of the thought and effort which others have brought into their work.

To do this to the best advantage it has frequently been found advisable to mention the products of various manufacturers, many of whom are advertisers in the National Builder. This does not mean, however, that these articles are paid for in any way, for they are not. In fact, no advertiser or other concern of any character could buy space in these columns at any price.

Under the new postal law, passed August 24th, 1912, any reference to an advertiser or firm or to any particular material which could be interpreted as a paid advertisement might be interpreted as advertising matter and as such must be clearly designated.

In order, therefore, to conform with the letter of the law, this section is designated "Advertisers' Section," and each page is so marked.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, ETC.

The National Builder, published monthly at Chicago, Ill., required by the Act of August 24, 1912.

Editor, Fred T. Hodgson, 537 S. Dearborn street, Chicago, Ill.

Managing Editor, Charles A. Miller, Jr., 537 S. Dearborn street, Chicago, Ill.

Business Managers, Fred A. Hodgson, 537 S. Dearborn street, Chicago, Ill.; Fred D. Porter, 537 S. Dearborn street, Chicago, Ill.

Publisher, Porter-Hodgson Company, 537 S. Dearborn street, Chicago, Ill.

Stockholders, Fred A. Hodgson, Fred D. Porter, 537 S. Dearborn street, Chicago, Ill.

Known bondholders, mortgagees and other security holders, holding 1 per cent or more of total amount of bonds, mortgages or other securities: Alfred E. Taylor, 24 N. 5th avenue, Chicago, Ill.; Chas. S. Roberts, 2337 Calumet avenue, Chicago, Ill.

PORTER-HODGSON COMPANY,
Fred D. Forter, Treasurer.

Sworn to and subscribed before me this 1st day of October, 1912.

HARRY L. KIRBERG,
Notary Public.

(My commission expires January 22, 1913.)

SAFETY WITH DUMB WAITERS.

The use of elevators and dumb waiters to get material from floor to floor compells the use of what may be called low-grade, unskilled labor. For this reason far greater precaution must be taken against risk of injury or accident than where trained employees can be given charge of the work.

For this reason the Kimball Bros. Co., Council Bluffs, Iowa, have designed their dumb waiters and elevators to be as near proof against misuse as can be made. The cut on this page shows the simplicity of the overhead gearing used in their ordinary dumb waiter, which has a capacity of from seventy-five to one hundred pounds.

The Kimball Bros. Co. are also well-known as manufacturers of elevators for both freight and passengers. The recent catalogue which they have sent out shows in considerable detail the mechanism used in their outfits, and gives a long list of a few of their customers throughout the country. This permits the intending purchaser to consult these customers when in the market for machinery of this character and learn from the user and from personal observation exactly how satisfactory the outfits are. This catalogue, which is of value to the contractor in laying out the hatchways, etc., for cars should be in the hands of every contractor and builder.

THE NEW PARKHILL PITCH GAUGE.

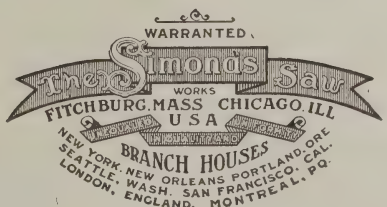
It is not necessarily the heavy and cumbersome machines and tools which perform the greatest amount of service. The new Parkhill Pitch Gauge for roof framing, as manufactured by John Parkhill, Rochester, Minn., is one of the handiest attachments which can be imagined for assisting the carpenter in laying out his work, such as rafter framing, stair and brace work, and wherever careful measurements and laying out are required. The Parkhill Pitch Gauge consists of two small devices attached to the ordinary steel square, on one of which is an extension arm containing a small table of figures by which the cuts for any rafter may be readily determined. So simple is the operation of this device that an intelligent carpenter can learn to use it after a few minutes reading of the simple directions which accompany it.

This Gauge is sent out with the privilege of returning if it fails to do the work which the carpenter thinks it will, or if it is not perfectly satisfactory in every way. Those who have used it would not part with it under any circumstances, as the saving which it effects on every job amounts to far more than its small cost.

At Christmas a Gift that would brighten the smile of any master carpenter, or would fire the ambition of the young apprentice, would be a SI-MONDS HAND SAW. This most modern saw will cost you

$2.50

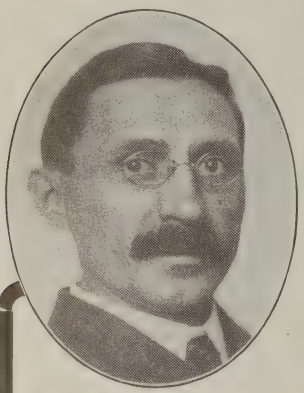
Look for Our Trade Mark



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Learn Architectural

$175 a Month For You.



Yes, $175 a month for expert draftsmen is an Many earn three, four and five thousand dollars instruction.

And you can get the proper instruction— need of leaving your present position. I will

Carpenters, builders—in fact, men in almost Drafting and doubled their income the first year. draftsman. I offer to teach you in a short time at little expense right in your own home.

I Will Give You Personal Instruction

For over twenty years I have been doing the highest paid expert drafting work. I am chief draftsman of a large and well known company. Long ago I saw the demand for practical trained draftsmen. I organized my practical methods for ambitious men whom I train personally.

And I will give you the same personal instructions that I have always given my students. I watch every piece of work that you do and tell you just what is the matter with it. If it is right, I tell you so. If it is wrong I show you where the mistake is. You get the training with practical work; work just like large firms are paying $175 a month for. Send the free coupon for my big book and full particulars of this offer.

More Men Needed

Never before in the history of architectural drafting has the demand for trained men been so urgent. Thousands of positions are open. The large concerns are actually crying for men to do the work. No wonder they are paying huge sums for the services of trained architectural draftsmen. And you can get the training that will bring you $175 a month right in your own home during your spare time. I know just exactly what they demand, because I have done work for them for over twenty years. And I will give you just the training—just the knowledge—just the skill that you need in order to get one of these positions. Write today—get full particulars of this offer now.

Position Guaranteed

Every week I receive dozens—yes, scores of requests for trained men. In fact, I publish every week a list of the positions that I know are open. If you write at once I will send you this list and show you just exactly the opportunities that I know to be at hand. And there are thousands of others besides those I hear of. Positions that are paying from $125 to $175 a month.

I have trained hundreds of men so that they were made expert architectural draftsmen and were able to accept positions paying from $125 to $175 a month at the start. Some of my students are making as high as $5,000 a year. You can do the same. I will guarantee to coach you just as long as you need the instructions, until you are able to accept one of these positions. No "whys" and "wherefores" about this proposition

Send the Free Coupon on Opposite Page

DO NOT DELAY AN INSTANT

How would you like to be drawing $175 a month six months from now? I have given others a chance and I will give it to you. Absolutely no obligations of any kind in filling out the free coupon. Just your name and address is enough, and I will send you my big free book and full particulars of the offer. Write today.

Chief Draftsman, Dept. 1679 Engineers Equipment Co., Chicago, Ill.

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

Drafting at Home

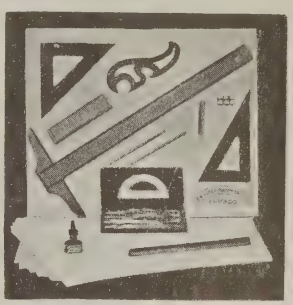
Others Have Done It. So Can You.

every day occurrence. How would you like to draw such a salary? a year. you can do the same—if you receive the proper practical

practical instruction *right in your own home during your spare time.* No give you *personal instruction* during your spare time.

every walk of life have taken my personal instructions in Architectural Here is your opportunity to become a expert practical architectual

I Will Give You This Outfit FREE

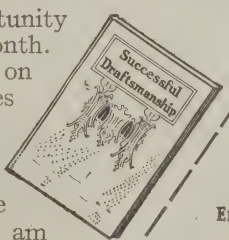


Here is the $15 drawing outfit that I will give you absolutely free. I want every one of my students to have practical working instruments. You can't do practical work with toy instruments, so I have selected these instruments from the stock of one of the largest manufacturers in the country. I will give you this outfit absolutely free. You cannot duplicate it for less than $15. I will give it to you absolutely free. As chief draftsman of a big firm I know exactly the quality and quantity of practical training, knowledge and actual up-to-date experience you must have in order to obtain a good position and advance to the highest salary. I also know the kind of instruments that you need.

Send Me the FREE COUPON

For Full Particulars and FREE BOOK

Do not delay an instant. Here is your opportunity to get a position paying from $125 to $175 a month. Just think of it—six months from now you can be on the pay-roll drawing your $175 a month. How does that sound? The first step is to put your name and address on the free coupon and get my free book, "Successful Draftsmanship." It tells you all about the personal instructions that I will give you. Gives you full particulars of the special offer I am now making. I will also send you a copy of the guarantee that I give you. Absolutely no obligations of any kind in putting your name and address in the free coupon. All it means is that I send you the free book and full particulars of the offer. So do not delay an instant. Here is your opportunity. Mail the free coupon in to me today.



CHIEF DRAFTSMAN, Dept. 1679
Engineer's Equipment Co., Chicago, Ill.

FREE BOOK COUPON

Chief Draftsman,
Dept. 1679
Engineer's Equipment Co.
Chicago, Ill.

Dear Sir:—

Without any obligation on me whatsoever, please send me your book "Successful Draftsmenship" and full particulars of your offer to personally instruct a few ambitious men. I assume no obligations whatsoever.

Name .....

Address .....

.....

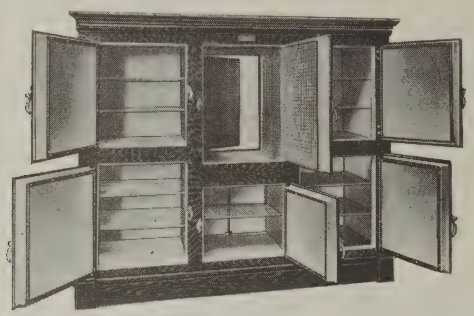
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

N.A.T. BUILDER

HERRICK REFRIGERATORS.

The Herrick system of refrigeration is the result of many years experiment and study. It has been found that to secure the best results in refrigeration careful attention must be paid to the design of the interior of the refrigerator as well as to the insulation which keeps the ice from melting too rapidly.

In the Herrick refrigerators the interior is so designed that there is a continuous current of cold air through the entire space, and surrounding all of the food placed in it. This



Herrick Special Refrigerator, Built for Home of R. C. Merryman, Marinette, Wis.

continuous current of air prevents any possibility of dead air, lack of circulation, etc., so common in carelessly constructed refrigerators.

The insulation of the Herrick refrigerator is also very carefully designed. A heavy packing of the finest quality of mineral wool is used, besides the usual line of wood and metal.

One of the prominent features of Herrick refrigerators is their design for outside icing. By this system it is possible to fill the refrigerator with ice from the outside of the building so that the iceman is not compelled to enter the house, but can fill the icebox whether the family is at home or not. This plan means the saving of considerable annoyance through tracking up the floor, dripping water through the house and disturbing the contents of the refrigerator.

The latest catalogues of the Herrick Refrigerator Co., Nos. 40 and 21 contain a great deal of information for the architect, builder, contractor and owner. Each of these should have these catalogues mentioned above for reference in designing the house, as well as in building. Many of the refrigerators made by the Herrick Company are designed to be built in at the time the house is built, thus saving in time and also providing a more harmonious interior for the house. These catalogues are sent free on request and are of great interest.

MACHINE KNIVES.

A neat booklet recently distributed by the Disston Company describes in great detail their methods of producing machine knives. The user of knives is interested in knowing exactly how they are produced and the care used in making them. This booklet can be secured from Henry Disston & Sons, Philadelphia, Pa., by mentioning the NATIONAL BUILDER.

DIRECT TO THE CONTRACTOR.

The Hewitt-Lea-Funk Co., 629 First avenue, Seattle, Wash., have recently inaugurated a system by which they sell and ship lumber and building materials direct from their mills to the contractor. This system eliminates the wholesaler, commission man, the retailer with his salesman, and materially reduces the cost to the consumer. In the short time that this system has been in service, this company has become convinced that it is the right one and that they should have made the change earlier. From the many voluntary expressions of satisfaction which they have received from their new customers they are led to anticipate an enormous increase in their business, which will mean reducing prices to the consumer.

The Hewitt-Lea-Funk Co. own billions of feet of fir, cedar, hemlock, spruce and western soft pine in Washington, Oregon, California and British Columbia. They own their mills and the railroads and equipment by which the logs are brought in. All this insures prompt shipment of first-class materials at reduced cost.

This company publishes a large lumber price list which is sent free to contractors and builders and also maintains a large corps of estimators for figuring house bills. The estimate blanks which they send out are a model of simplicity by which every item is sure to be included as well as carrying forward the amounts, prices and weights.

THE GLORIA LIGHTING SYSTEM.

Antiquated lighting systems have no place in the modern home, office, shop or factory. The improvement in lighting systems has practically reached its logical limit in the Gloria Lighting System by which it is possible to install a high-candle power lamp wherever required. This lamp burns gasoline, the storage of which is outside the building so that there is no danger of explosion or leakage. Each light is independent of all the others and any one can be turned on or off without affecting the others.

The installation of a Gloria Lighting System makes the owner absolutely independent of gas or electric light companies. In many cities or towns the electric lamp plant does not run all night and does not run at all during the day so that on dark days or in dark corners the merchant or manufacturer as well as the householder are seriously handicapped in their work.

The Gloria Light Co., 1266 Washington boulevard, Chicago, Ill., issues a catalogue of interest to the contractor, builder and home owner, and have an interesting agency proposition for those in towns where they are not already represented.

What the Builder Can Learn from the Grocer

THERE is a certain money-making piece of information which a builder can obtain from grocers. He can get the same from druggists, jewelers, hardware and furniture dealers, dry goods men and even from music and piano dealers.

Most of these men have learned in the last few years that the magazines are creating a tremendous demand for advertised goods. Do you know that national advertisers are spending eighty million dollars a year in the great weekly and monthly publications?

How Does This Affect the Contractor?

These men are learning that the easiest goods to sell are those that advertising has half-sold for them in advance. And such goods make satisfied customers, simply because the national mediums are becoming more particular all the time about who advertises with them, and will not advertise poor merchandise.

The wisest thing a builder can do is to sit down with some high-class woman's magazine, like Good Housekeeping Magazine, and see just what construction materials are being advertised. He will be surprised to see how many they are, and how excellent they are.

He will find that the swiftest way to win a woman's favor to his house-plans and his bids is to incorporate some of these advertised products in his specifications. And he will open his eyes when he finds how familiar the women are with a great many of these construction specialties. Here are some of them, as advertised in and absolutely guaranteed by Good Housekeeping Magazine:

Standard Sanitary Plumbing Fixtures
Tuec Stationary Air Cleaning System
Monarch Metal Weather Strip
Sherwin-Williams Paints and Varnishes
Vudor Porch Shades
Maxwell's Lakeside Rug Border
Tyler's Domestic Hot Water Generator
Carpenter's Spring Shades
Wild's Parquet Inlaid Linoleum
Elastica Floor Finish and Kleartone Stains
Brenlin Window Shades
United States Radiators and Boilers
Sargent's Builders' Hardware
Siwelclo Noiseless Closet
McCray Refrigerators
Utility Wall Board
Sanitas Wall Covering
Beaver Board
Pratt & Lambert "61" Floor Varnish
Vitralite White Enamel
Minneapolis Heat Regulator
Macbeth-Evan's Glass Shades and Globes
Alabastine Wall Tints
Alabasco Fast Wall Paint
Mellotone Wall Finish, High Standard Liquid Paint, Oil Stains (Lowe Brothers)
Imperial Sanitary Flooring.
Valspar

Give the Public What It Wants
It Wants Advertised Goods

The magazine publishes GOOD STOREKEEPING, a quarterly devoted to this question of cashing in on the wide demand for advertised products. A copy of it, and a copy of Good Housekeeping Magazine, will be sent free on request to any contractor or builder. Address Dealers Service Department, Good Housekeeping Magazine 381-C, Fourth Avenue, New York.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE NEW SYSTEM OF SEWAGE DISPOSAL.

There has been, for years, a great need of an economical and thoroughly reliable indoor closet system to replace the insanitary and inconvenient outdoor closet. The privacy and comfort of the city bathroom closet has been entirely out of the reach of thousands on account of the expense of installing a water system, and also because of objections to the septic tank system. Purification of sewage by chemical means has long been in successful operation in England and Germany, but hitherto the high cost of the chemical has prevented the general adoption of the chemical system for family use.

About five years ago, however, the discovery of a cheap supply of a chemical well adopted to this use rendered it practical to place on the American market a chemical system of

sewage disposal which has proven absolutely economical and sanitary for not only the small country residences, but for schools, factories, theaters, city parks, fairs, etc.

The illustration shows the Hawkeye Odorless Sanitary Closet, operated on this new antiseptic process of sewage. In appearance the Hawkeye Sanitary Chemical Closet resembles the ordinary water closet. Under the seat is arranged a trap cover called "Odor-trap," which opens and closes mechanically, positively preventing any odors from entering the room. The dip tube, which is twelve inches in diameter, connects the closet with the chemical tank. The chemical tank is placed in the ground underneath the edge of the house, only the cover of the tank being exposed. In this tank takes place the complete process of disintegration, rendering the residum absolutely odorless and harmless. When the tank is full—say once in six months—the residum can be dipped or pumped out and thrown on the ground anywhere, as if it was pure water.

The mechanical parts of the closet can not get out of order. They will last a lifetime. The closet can be placed in any part of the house and on either the first or second floor. The construction of the bowl, dip pipe, etc., is such that no water is required for flushing.

The thirty-five gallons which are placed in the tank at time of installing is sufficient to purify the sewage until the greatly reduced residum fills the tank. In the case of a family of five or six people, the tank will only require attention once in about every six months. The chemical will not freeze at 40 degrees below zero. The cost of the complete installation of closet, tank and ventilating parts is very moderate, also, and easily within the reach of all.

Full particulars will be mailed on request by the Hawkeye Chemical Co., Inc., Odd Fellows Bldg., Marshalltown, Iowa, to readers of THE NATIONAL BUILDER in Wisconsin, Louisiana, and in states west of the Mississippi River. The Hawkeye Chemical Co. wants to make a special offer to contractors and builders located in the territory mentioned for installing these chemical closets. They state that these closets really come as near selling themselves to property owners as anything can, and that they are sure they can show our readers how to make a nice lot of money during the winter months, no matter how cold the weather. They already have quite a number of closets installed in Marshalltown and neighboring towns, and as this is really a very important building subject, it is well worth knowing about.

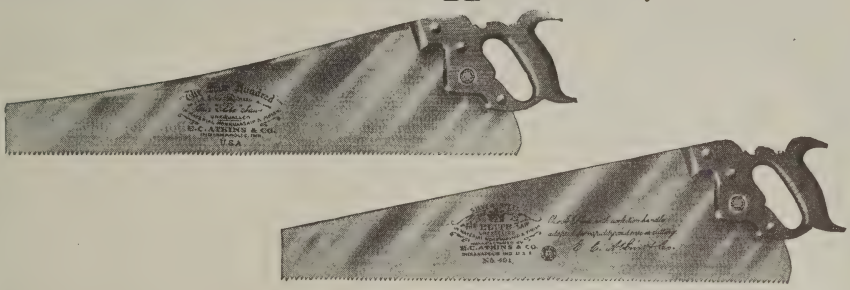
POCKET MAGNETIC COMPASSES.

A pocket compass forms a necessary part of the equipment for the hunter, explorer or tourist and no one of these should think of going far without a reliable instrument of this character.

The Keuffel & Esser Co., 127 Fulton street, New York, have recently issued a pamphlet showing a great variety of compasses for various purposes. This pamphlet also indicates some of the many other instruments manufactured by the Keuffel & Esser Company, such as measuring tapes, drawing materials, mathematical and surveying instruments, etc. Those of our readers who are interested in any of these materials should have this pamphlet and such of the other catalogues as they are interested in.

Saws for Christmas

Now—honestly—is there anything that you would rather receive for Christmas than a really fine saw? Then why don't you just suggest this to your friends?



Here are two *Famous Silver Steel Saws*—a straight and a skew back. Any man will be proud to own them. Then why not say to your wife or sweetheart—buy me for Christmas, an

ATKINS SILVER STEEL SAW

We will put them up for you in a handsome holly covered box like this—if you wish. This adds greatly to their appearance and makes of them a very beautiful and attractive holiday gift. Buy one for Christmas. Even if you have to "treat yourself." There is no saw as fine as ATKINS SILVER STEEL. The genuine *always* has our name on the blade.

Go to your dealer. Get an Atkins for Christmas. He will order for you if he does not carry them. If he won't, then let us know

E. C. Atkins & Company, (Inc.)

THE SILVER STEEL SAW PEOPLE

Indianapolis, Ind.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

A NEW BRANCH OFFICE.

We are advised by the H. B. Smith Machine Co., Smithville, N. J., that Mr. G. W. Simmons, formerly located with them in their Vicksburg, Miss., office, will have charge of the machinery department of the Allen Engineering Co. at Memphis, Tenn. Mr. Smith's long training in the machinery line makes him a particularly valuable acquisition to the Allen Engineering Co., who are now the agents for the Smith Machine Co. for their woodworking machinery in that busy section of the middle southwest.

WHY WOOD MANTELS?

Practically every house designed has in it a fireplace or mantel of some character. In many respects it is the most prominent feature in the house, with the possible exception of the front stairway. It is the logical center of the house, as it is nearly always the main feature of the living room or parlor and around it congregates the family and their guests.

The interior of practically all of our American homes is finished in wood regardless of the nature of the exterior. The fireplace of brick or stone looks more or less out of place, as it does not harmonize with the trim or the furniture. For this reason a wood mantel conveys a sense of appropriateness and when properly selected, of dignity in keeping with the rest of the apartment.

There are, of course, styles of mantels for every style of architecture, furniture and decoration. It may be the simple fireplace for a gas grate, or it may be an elaborate one for wood or coal. In any event, it must harmonize with the rest of the apartment. It is with the intention of presenting to the prospective builder, as well as to the architect, the contractor and the builder, an outline of the various styles of mantels that Chas. F. Lorenzen & Co., 703-709 North Sangamon street, Chicago, Ill., have prepared a neat booklet on the above subject. This booklet shows a number of different designs for different styles of buildings and to suit different pocketbooks. This booklet is sent free on request and if desired they will also send their complete catalogue of modern mantels.

EVERWEAR PAINTS.

While no contractor or builder can know the details of every trade, it is well for them to be posted on the general requirements in each line. The subject of paintings and paints has always been attended with more or less mystery, it being claimed that none but an expert painter could understand the rules for measuring and determining the amount of paint required, and that none but the painter on the job could mix up the paint for use. The consumer has been told that ready made paints would not give satisfactory results and that they were apt to contain injurious ingredients.

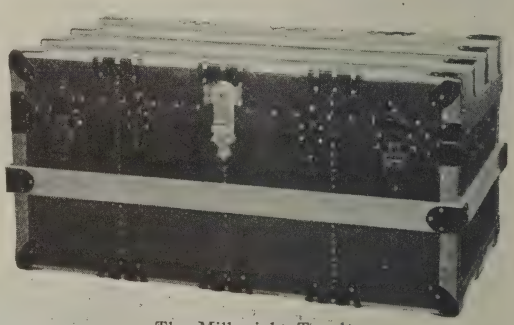
There are, however, many concerns producing excellent ready made paints, which in quality are equal and frequently superior to hand mixed paints. One of these, Crosby, Frank & Co., 297 Peoria street, Chicago, have just issued a catalogue of their celebrated Everwear paints, which they claim are particularly adapted for house, barn, floor, carriage, wagon, and implement painting.

This catalogue contains besides color cards, rules for ascertaining the quantity of paint required, as well as for determining the kind of paint, color combinations and suggestions regarding paints for various purposes. This catalogue will be sent to our readers on request.

CARPENTER'S CASES AND TRUNKS.

Good appearance on the part of the carpenter, not only his personal appearance but that of his tools, is frequently the means of landing a job or a small contract. The carpenter who carries his tools in a neat case is usually give the preference over one who carries them loose under his arm, sticking out of his pockets, or tied in a cement bag.

The caretaking of tools by keeping them in a first-class chest or tool case means money saved and greatly shortens the time spent in keeping them in order. The cost of good tools lost or damaged quickly amounts to the cost of a chest or case.



The Millwright Trunk.

The William Lorenz Trunk Works, 109 2nd street, S., Minneapolis, Minn., are making a specialty of tool trunks and chests, and tool cases for carpenters. We show on this page a trunk made of basswood lumber covered with black enameled sheet steel, bound with Russian iron and hardwood slats, and having extra heavy malleable iron corners. The trunk is manufactured in the best possible manner to withstand the heavy service to which it will be subjected. The manufacturers believe that this is one of the best trunks on the market for the busy carpenter.

The general catalogue of the William Lorenz Trunk Works contains descriptions of a number of other trunks, chests, and cases of interest to the mechanic. Surely in their lists will be found one to suit the most particular carpenter.

BIRCH
AMERICA'S FINEST WOOD

BIRCH IS AN HONEST WOOD. It does not masquerade under high-sounding commercial or foreign names. **BIRCH** stands on its own merits—a native American wood for American homes.

BIRCH IS A PERMANENT WOOD. The finish and lustre last as long as the wood itself. **BIRCH** does not warp nor shrink. Close-grained, wear-resisting, and not easily marred, **BIRCH** can be depended upon to stay where it is put and give steady, reliable service.

BIRCH IS A VERSATILE WOOD. It takes readily and artistically any desired stain, while a finish in natural colors is very attractive. Moreover, **BIRCH** is so adaptable that it gives the best effect for the interior trim of every part of the house from cosy corner and built-in book case to kitchen and bedroom.

BIRCH COMBINES BEAUTY AND ECONOMY. **BIRCH** finish half furnishes a house. The cost of **BIRCH** makes possible its use in the modest cottage and bungalow, while the peculiar richness of tone and figure pleases the most discriminating architect and builder. **BIRCH** is a dignified, durable wood with a refined appearance that gives increasing satisfaction with each year of use.

WRITE TODAY for our illustrated BIRCH BOOK "D" which shows how BIRCH is used in modern homes, apartments and office buildings. The book and sample of BIRCH in stained and natural colors will be SENT POSTPAID on request.

NORTHERN HEMLOCK
& HARDWOOD MANUFACTURERS ASSOCIATION
WAUSAU, WIS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

JOHNSTON'S DULL KOTE PAINT.

The art of decoration that a people has achieved is to a certain extent the measure of the refinement and culture which they have reached in the progress and civilization of the world. An empty room with bare walls and ceilings possesses little charm, but decorated in suitable colors and draperies, it becomes a fitting habitation for man.

The styles of decorations which have been developed from time to time have all had as their basic principle the use of color, and the coloring of form has been equalled by the decoration of plain surfaces. For this reason we see flat walls and ceilings beautifully decorated with stencil and other designs harmonizing with the other trim and furnishings of the room, and with the purpose of the apartment.

The detail of the various patterns and decorations can be best brought out by a paint which has no surface polish. For this reason a flat or dull kote paint posseses unusual qualities for all interior decorations. The glare of light on a gloss paint kills all of the fine effects of color and design, and should never be used.

The R. F. Johnston Paint Co., Pearl & Main streets, Cincinnati, O., have perfected their washable Dull Kote paint so that it is generally accepted as one of the best mediums for interior decoration on wall board, plaster, or other interior finish. This preparation is sanitary, artistic, and lasting and can be washed with water with a sponge, without affecting its quality or its dull finish.

The R. F. Johnston Paint Co. have issued a number of circulars showing many places where their paints have been used, and giving some of the many reasons why this material has proven eminently satisfactory. The color cards which they send out show a complete range of tints and colors by which any desired shade or decoration can be obtained.

INTERIOR MILLWORK.

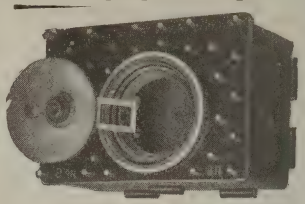
Catalogue No. 100 of the Harty Bros. & Harty Co., 21st place and Loomis street, Chicago, Ill., is an exceptional catalogue in many respects. Combining as it does working drawings for sideboards, buffets, halltrees, colonnades, consoles, etc., as well as photographic reproductions of work already in place, it is of value to the architect, the contractor, builder and owner.

The designs for mission trim, showing beam ceilings, picture moldings, casings, etc., enables the contractor to order stock material which will present a pleasing appearance when erected in place.

The Harty Bros. & Harty Co. advise us that besides the work shown in this catalogue, they are in a position to make minor changes in the designs shown, or to get out work from architect's drawings or special drawings which they will submit on request. They suggest that the contractor send them the plans for such buildings as they are figuring, in order that they may give them a close estimate on the work in their line.

THE GALE WALL SAFE.

Every contractor having the interests of his client at heart realizes the value of making a portion of the building absolutely fireproof. For the purpose of preserving insurance papers, contracts, plans, etc., every contractor should have his own home equipped with a fireproof safe.



It is not always necessary to have a large, cumbersome safe, as the actual number of valuable papers are usually comparatively small, but it is necessary that absolute protection be secured. The Gale Wall Safe, made by the Willis Mfg. Co., Galesburg, Ill., offers absolute protection from fire, as well as from burglars, petty thieves, etc. This wall safe is designed to be built into the wall, either during construction or in buildings already completed. When in place, only the dial is exposed, and this can be covered by a small picture, if desired. In this position it requires no floor space, and is inconspicuous.

The Willis Mfg. Co. will be glad to send further particulars regarding this wall safe to our readers on request, and we would suggest that it is an excellent thing to put in your own home, as well as to recommend it to your clients.

A DOUBLE ACTING FLOOR SCRAPER.

The proper finish of hardwood floors usually requires that they be carefully scraped as soon as laid. To do this properly requires a scraper built upon correct principles in order that time and labor may be saved.

The Weber Double Acting Floor Scraper is a product of many years practical experience in the finishing of hardwood floors and the manufacturers are confident that the machine combines all the requirements of a first-class scraper. The adjustable blade can be set to give the best results upon different kinds of wood and for different conditions. The construction of the machine is such that a cut is made on both the forward and back stroke, thus saving considerable in time. The automatic sharpening device which goes with every machine enables the operator to put a perfect edge on the blades and in fact prevents him from putting any other kind of an edge on.

The Weber Manufacturing Co., 661 71st avenue, Milwaukee, Wis., have over a hundred demonstrators throughout the United States and are prepared to have one call at any given place at the convenience of the contractor and give a thorough demonstration of the machine. The liberal methods of sending machines on trial prevents any misunderstanding by the contractor, as he has the use of the machine before he is asked to pay for it. The Weber Manufacturing Company is anxious to hear from contractors, who are not familiar with the merits of their scraper, with the idea of posting them fully upon its advantages.

More pay for your work

Luther Shop Tool Grinder

Sent to You on FREE TRIAL

FOURTEEN MACHINES IN ONE: 1—Fine Dimo-Grit wheel. 2—Coarse Dimo-Grit wheel. 3—Universal tool rest. 4—Chisel and plane bit guide. 5—Dimo-Grit razor hone. 6—Dimo-Grit scythe stone 7—Dimo-Grit saw gummer. 8—Felt polishing wheel. 9—Medium Dimo-Grit wheel. 10—Cloth buffing wheel. 11—Dimo-Grit oil stone. 12—Dimo-Grit pocket hone. 13M—Plane bit honing attachment. 14M—Twist drill sharpening attachment.

SHARP tools enable you to either reduce your shop costs or get greater profits for your work. The rapid *Dimo-Grit* sharpening wheels of the Luther Shop Tool Grinder sharpen tools 25 times faster than the grindstone and are many times more efficient than emery. Positively will not draw temper. No water needed for cooling. Special tool rests give you the exact bevel for sharpening all tools. *Dimo-Grit* wheels are especially made for sharpening steel.

¶The Luther tool grinder is built entirely of steel and iron, has enclosed shaft drive like an automobile and dust-proof bearings. No chain to stretch or break.

Write for 40-page book which gives full particulars about this wonderful labor saving machine. We will send any outfit you may select on 30 days' trial without prepayment.

LUTHER GRINDER MFG. CO.

1419 Michigan Street MILWAUKEE, WIS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

MODERN MANTELS.

Catalogue No. 42 of the Central Mantel Co., 1237 Olive street., St. Louis, Mo., contains a beautiful variety of mantels and fireplaces suggesting the artistic effects possible by the use of artistic tile and wood mantels and fireplace trimmings. Aside from the many beautiful styles and designs of mantels shown, there are cuts showing the complete design of grates, linings, screens, baskets, etc., for use in all styles of mantels, as well as directions for setting wood mantels, tiles, and fireplaces, mounting tile in slabs, suggestions for chimney design, etc.

The Central Mantel Co., among other novelties shows their superior bathroom heater, which burns either natural or artificial gas, and which can be installed in either new or old bathrooms. The owner or tenent who has heretofore been obliged to live in a house with a bathroom insufficiently heated will appreciate this heater, as it permits the bathroom to be quickly brought to any desired temperature.

We understand that our readers who are interested in this subject can obtain this beautiful catalogue without cost.

EXPANSION BOLTS.

The Star Expansion Bolt Co., 147-9 Cedar street, New York, have just issued a pocket size booklet containing illustrations, descriptions and list prices of the various toggles and similar bolts now on the market. A copy of this booklet will be sent to our readers upon request.

The use of tile and concrete in construction has necessitated the use of expansion bolts, toggle bolts and similar devices for fastening various portions of this structure to the masonry. The Star Expansion Bolt Co. has originated a large number of special devices of interest to the builder, many of which are described in this booklet.

THE WINTHROP ASPHALT SHINGLE.

There are a number of ways to test building materials. Some materials have weather resisting qualities, but it would require years to give them an adequate test by exposure to the weather. Other materials may be incombustible, but still be damaged by exposure to a hot fire, or by the sudden chilling should water be thrown on it while hot. It is difficult to test any material for its resistance to lightning.

We can, therefore, only make relative tests to determine the value of structural materials. In the case of the Winthrop Asphalt shingle it is possible to make severe tests to determine their good qualities. Being made of asphalt, they are, of course, impervious to water, and cannot be injured by frost. The sun's heat and light will not damage them, and they are fire resisting and lightning proof.

The Winthrop Asphalt shingle differs from most other forms of prepared shingles in that it is tapered, being thickest at the butt where the heaviest wear comes, thus adding greatly to its life without a corresponding increase in weight. As the shingles are all carefully made and packed, there is practically no waste, as with wood shingles, but every one can be used in turn.

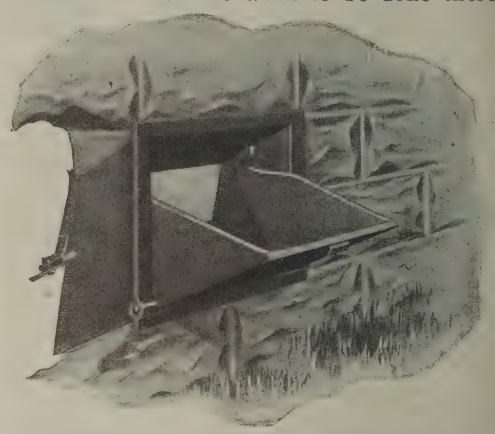
The fact that the nails used to fasten these shingles in place become coated with asphalt when being driven through the shingle prevents their rusting, and as each shingle lays closely onto the one below it, there is no chance for the snow or rain to drive up under them.

Winthrop Asphalt shingles can be used on either new buildings or they can be laid directly over old roofs, thus saving time and labor.

The recent catalogues sent out by the Winthrop Asphalt Shingle Co., 10 61st street, Argo, Ill., show many other points of advantage for this material. If desired, this company will send a sample shingle so that the inquirer be fully posted.

ROENIUS WOOD AND COAL CHUTES.

While the basement of the modern house is seldom open to visitors, there is no reason why it should not be planned and built with consideration for the work to be done there.



How often we see a coal bin to which access can only be had through a tortuous alley way and possibly a small window in one corner with one or more lights of glass cracked or gone entirely? If there was no other way, it might be permissible to hang an ordinary wood sash over the coal window, but there is an excellent wood and coal chute on the market which also admits light to the basement. The Roenius Wood and Coal Chute, made by the Grand Rapids Foundry Company, Grand Rapids, Wis., is an excellent device for this purpose. Being made of metal, it is indestructible and presents an ornamental appearance. They are made to stand the use and abuse to which the chute is subjected, and can be easily opened and locked. The circulars which the Grand Rapids Foundry Company sends to inquirers describes this coal chute in detail and supplements the illustration which we give above.

YOU can build SUCCESS. STUDY is the FOUNDATION.

YOU'VE got SUCCESS in you! There's MONEY and POSITION ahead for you and COMFORT and LUXURY for your family. START is what you need—KNOWLEDGE is the ladder that will carry you up. Get your BRAIN at work instead of your HANDS—it has endless MONEY-MAKING POWERS.

Don't say you cannot learn—YOU CAN! Don't say you haven't the time—TAKE IT! Don't say you cannot afford the tuition fee—EARN IT! Get the "I WILL" spirit—BUCKLE DOWN to study for a little while NOW—and have many years of POSITION AT THE TOP. Here is the LADDER—

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Short, Complete Home Study Courses in

Architectural Drafting	**Plan Reading**
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These courses offer YOU a chance to build SUCCESS—a chance to get out of the low paid class. Grasp this opportunity NOW that will lift YOU into a better job with a bigger salary. These courses offer you the chance to get the knowledge that will make YOU the man who GIVES orders—the man who OWNS the business.

Study at home in leisure hours. Remember the home study work is the same as our college day and evening classes. We give both resident and home study courses. State which you want.

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By A. ASHMUN KELLY

A complete manual of the art and practice of finishing woods by staining, filling, varnishing, polishing, etc.

The woods and the fillers used are described at length and directions are given for ordinary finishing, for finishing and fuming oak, for veneer work, and for French polishing. Stains and staining constitute an important division of the manual, and a wealth of practical formulæ is presented. Varnishes, their make-up, tests, and uses, is another capably-handled branch of the subject. Instruction for renovating old furniture and on the treatment of stains and spots brings to a conclusion a very useful exposition of an important art.

Bound in silk cloth and boards, 340 pages. Price, postpaid, $3.00.

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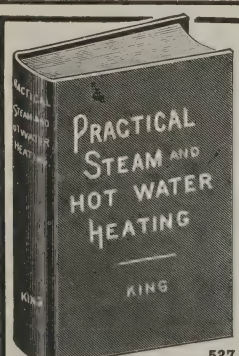

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A NAT. BUILDER PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

FLEX-A-TILE ASPHALT SHINGLES.

Some contractors readily believe many things which they see in print; other contractors believe nothing they see printed. Between the two extremes, the discriminating contractor picks out the materials best suited to his purpose.

Among the advocates of the various forms of roofing, some claim too much and others not enough for their wares. Between these two, the discriminating contractor makes his choice.

The manner by which he makes his decisions varies with the materials and with the arguments for and against them. Sometimes the appearance alone will be sufficient; sometimes a careful analysis of their contents and process of manufacture are necessary.

The Heppes Company, 1012 45th avenue, Chicago, Ill., manufacturers of Flex-a-tile Asphalt Shingles are anxious to convince the aforesaid discriminating contractor of the merits of their shingles. They have talked to him and argued with him from time to time in the pages of the NATIONAL BUILDER and have carefully desscribed their methods of manufacture and the appearance of their goods. About the only thing left to do is to give them an ocular demonstration and they are therefore prepared to send to our readers a sample shingle which will show exactly the qualities which they claim for it.

CHANGE IN LUTHER GRINDER MFG. ORGANIZATION.

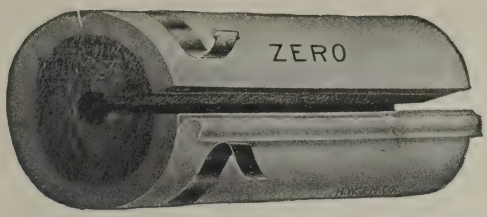
The Luther Grinder Mfg. Co., 1319 Michigan street, Milwaukee, Wis., advise us that they have selected Mr. Edwin B. Bartlett to fill the office of treasurer and superintendent of their company, this position having been vacant since the death of Mr. James M. Thompson.

Mr. Bartlett, for a number of years, has been acting as assistant superintendent for a large manufacturing concern in Milwaukee, and has an extensive technical training in mechanical engineering, as well as a university education. His experience and energy makes him highly suitable for his new position and we feel it a privilege to congratulate the Luther Company upon his connection with them.

THE STORY OF COMPO-BOARD.

The introduction of Compo-Board, designed as a wall covering only, soon developed a number of novel uses which the manufacturer did not foresee. Not only was it used for wall coverings for all classes of buildings, but it was used for temporary partitions, store panels, booths, display windows, backgrounds, screens and many other purposes.

The Northwestern Compo-Board Co., $776 Lyndale avenue, North, Minneapolis, Minn., have prepared a most interesting booklet showing some of the many uses of Compo-Board. Photographic reproductions of interiors finished in the highest degree shows in great detail how others have used this material. The contractor, the architect or the owner will find many suggestions for other uses in this book, which will be sent to them on request.



Perfect Pipe Protection in the Coldest Weather

THE freezing of pipes conveying water, gas, chemicals, etc., can be avoided by insulating with J-M Zero Sectional Pipe Covering. It is a combination of hair and wool insulating felts specially designed for the protection of such pipes.

J-M Zero Sectional Pipe Covering

is made in sections 3 feet long, to fit all standard pipes. It is easy and economical to apply and lasts indefinitely.

When exposed to extreme conditions of cold, two thicknesses should be used—one section over another, breaking all joints—and the surface coated with J-M Waterproof Cement.

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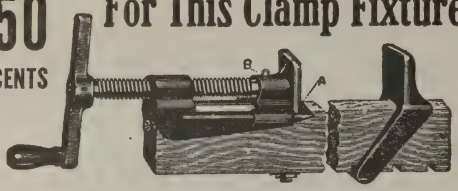

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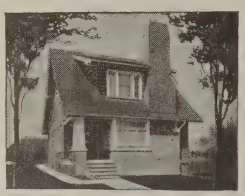

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ACETYLENE LIGHTING.

The contractor or builder who forgets his client as soon as the house is built is not doing his whole duty toward them. His guardianship should extend through the entire life of the building. He should give consideration to the furnishing, decorating, and the surroundings of the house, for the complete appearance of the building is in a way the measure of his care in regard to it.

When considering the lighting of the house, should it be located away from the established city gas mains, or other lighting companies, it is important that he investigate lighting by isolated plants. One of the best of these is by acetylene, and he will find the Davis Acetylene Co., 35 Prospect street, Elkhart, Ind., both able and willing to advise him intelligently regarding the proper system to be installed. The Davis Acetylene System has been in use long enough to convince the manufacturers that their principles are right and that no owner or contractor is making a mistake in using them either in their new buildings or in buildings already erected.

By the Davis Acetylene method, the use of oil lamps and other antiquated methods are entirely eliminated. Acetylene gas gives a pure white light of great intensity at a cost much less than oil or by purchasing commercial gas or electric light from other companies.

The Davis Acetylene Company will be glad to hear from architects, contractors, builders and owners who wish to investigate what they have to offer in this line.

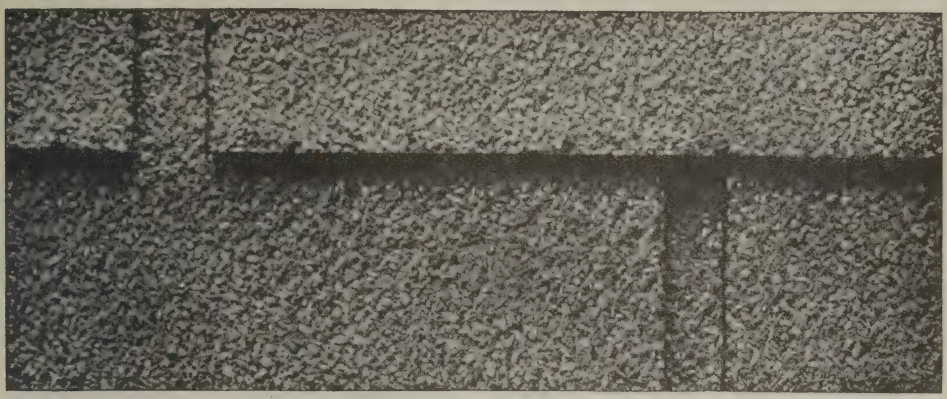
CORTRIGHT'S METAL SHINGLE ADVOCATE.

The current number of the Metal Shingle Advocate, published by the Cortright Metal Roofing Co., Philadelphia, Pa., 50 North Twenty-third street, contains a great deal of valuable information regarding good roofs. This number is particularly interesting to those contemplating re-roofing their old building, containing as it does numerous examples where Cortright Roofing has been used.

The Metal Shingle Advocate will be sent to our readers who write to the Cortright Metal Roofing Co. for it, mentioning THE NATIONAL BUILDER.

LIGHT; ITS USE AND MISUSE.

The Illuminating Engineering Society, 29 West Thirty-ninth street, New York, has sent us an interesting booklet on the above subject. This book was written for the general information of the public on the subject of light and illumination. The illustrations are particularly striking, presenting as they do concrete ideas about the use and misuse of lighting fixtures. The book will direct attention to the numerous evils attending bad lighting, such as various economic losses, injury to the eyes, accidents, etc., and will also create a desire for



FORGET all we have said about this remarkable roofing. Write for a free sample—you'll get it by return mail. Test it out for yourself. If it is all we say it is—you ought to know it.

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Are beautiful in appearance. They are fire resisting. Almost everlasting. They are easily and quickly laid —are more economical than wood shingles and a lot more satisfactory.

Surface is chipped slate or granite in natural colors of red and green and weather has no effect on them —they're great

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combine the artistic beauty of California bungalows with the structural requirements of the Northern homes. The designer is a Californian and knows the bungalow by heart.

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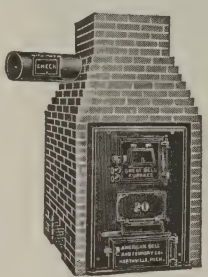

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FOR 5 AND 8 ROOM DWELLINGS

An unheard of Price and a most Remarkable and Indestructible Furnace. No Pipes—no Lost Heat.

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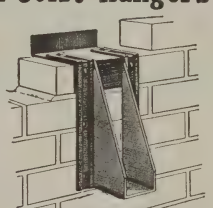

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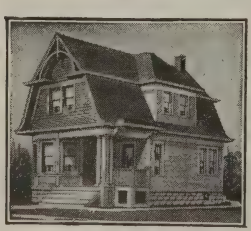

Send **25c in silver** (and 10c postage) for our big $1 book of plans. **"LOW COST MODERN HOMES,"** with houses from $1,000 to $3,000.

"PALATIAL MODERN HOMES" from $3,000 to $10,000, price 25c and 12c postage.

"COTTAGES AND BUNGALOWS" from $300 to $9,000, price 25c and 5c postage.

J. H. DAVERMAN & SON, Architects
1342 Murray Building - - - GRAND RAPIDS, MICH.

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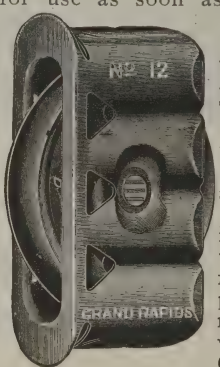
good illumination, not only in the home and office, but in the store, the mill and the factory. It shows also that good illumination is not a matter of expense, as the best illumination can be obtained at little or no more expense than a defective form. We understand that our readers can obtain copies of this work free by writing to the Illuminating Engineering Society, and mentioning THE NATIONAL BUILDER.

MAKING FRAMES IN WINTER.

Only a few years ago it was customary for every carpenter to be busy in his shop all winter making frames, sash, doors, trim, etc., for use as soon as the spring rush began.



The advent of framing mills has made it somewhat difficult for the small carpenter to compete in this class of work, but in the quiet months of the winter, many of our readers keep busy in their shops.

In making the frames, it is necessary to cut through the pulley stiles for the pulleys. These pulleys are made in various models, one of which is made by the Grand Rapids Hardware Co., 118 Pearl street, Grand Rapids, Mich., possesses features of interest to the contractor who is satisfied with nothing but the best. These pulleys are designed to be put in with very little cutting and fitting, it being necessary only to bore four holes. Where the contractor has a portable woodworker with a boring spindle it is possible to bore all four holes at one operation, thus saving time and money.

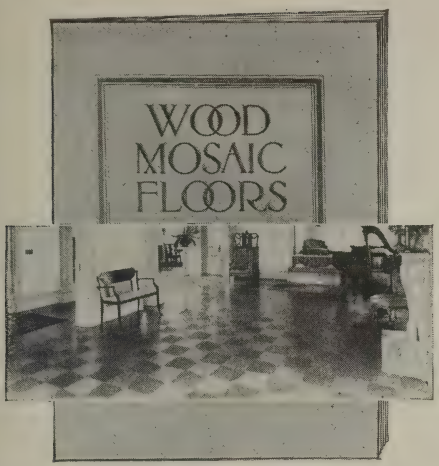
The Grand Rapids Hardware Company is anxious to have the merits of their pulleys understood by all contractors and for this reason they offer to send a free sample to those of our readers who request it.

THE GAGE SELF-SETTING PLANE.

One of the first tools which the apprentice starts to use is the plane. It, therefore, has to stand the hardest and roughest wear and often much misuse and abuse. In spite of this, however, it must remain true and must be easily adjusted to overcome whatever difficulties it may get into.

The Gage Tool Company, Vineland, N. J., manufacture a plane which they believe possesses unusual advantages. So certain are they that these advantages will be appreciated that they offer to refund all money paid for it if it is not entirely satisfactory and they further offer to pay all the shipping expenses both ways. An offer of this character has met with an unusual response from all sections of the country and the Gage Tool Company are very well pleased with the commendatory letters which they receive with regard to it.

The Gage Tool Company have for some time been making a special offer to contractors



Are you in the habit of stepping over a hundred dollar note rather than to stoop and pick it up? The comparison between just such action and the reasons why you should open relations with us is not overdrawn.

Never, in all the history of the country, has the demand for Parquetry flooring been greater. Besides, never has there been a more psychological time for intensifying that demand. We make these two statements with the utmost sincerity—not in the sense of an argument.

For many years we have had our heart set on a piece of business literature that would in as few pages as possible concisely delineate the virtues of hardwood floors and especially the Wood-Mosaic Products. We have never experienced any difficulty in maintaining our supremacy in the more difficult and pretentious field. Wood-Mosaic quality and service has sort of become a recognized standard. The elaborate, complicated, more expensive and installations where there was the need of creating designs or the true interpretation of stipulated ideas naturally worked themselves to our factories and agencies. Meanwhile, we have of course produced thousands of the smaller and more medium priced jobs—which does not signify, however, products of a lesser quality.

In the run of every-day contracts we have found that price has been a very important consideration. Virtually everybody admits the desirability of hardwood floors and in the same breath they raise a great big *But—Price.* Explanation of the desirable features and the fact impressed that the cost is in comparison with the price of a carpet, parquet floors are almost invariably selected.

We have just issued the booklet which we have so long had in mind. It tells the whole story so simply and impressively that we want to send you a copy with our compliments. The appeal is directed at the consumer but the information is for your consideration also.

Then, we want to open negotiations with you regarding livening things up around your town. We might say here that not everyone can represent us. We are looking for only men of the right calibre. If you are willing to spend a few postage stamps investigating, we would be glad to hear from you. If not that progressive to meet us half way, we can't do business anyway. "Order takers" have cobwebs in their windows. The public and their purse follow the "Pied Piper."

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WOOD-MOSAIC FLOORING TRADE MARK REGISTERED

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Vincent Methodist Episcopal Church, Nutley, N. J. Roofed with Asbestos "Century' Shingles by the late Olive Newcome Elliot, Architect, and the Republic General Contracting Co., Contractors, both of New York City. Reproduced from an Artist's Drawing.

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THERE ought to be some nice business in your section in replacing worn-out roofs with Asbestos "Century" Shingles.

Through the advertising pages of *Country Life in America, Keith's Magazine* and *House and Garden,* we are suggesting to property owners that they consult you about it—*soon,* so that you can plan to take care of their work.

These advertisements will be seen everywhere by owners or tenants of the better class of buildings.

A little personal looking up of these prospects should bring you good results.

Write our nearest Branch Office for information about Asbestos "Century" Shingles and Booklet, "K. and M. 1912."

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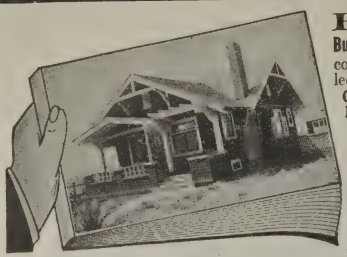

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Builders' Plan Book
containing a nice selection of views for **COLONIAL HOMES, BUNGALOWS AND COTTAGES.** Floor plans with size of rooms and arrangements. Full description of finish, cost, etc. **The result of years of planning and building homes.**

Residences, $1000–$6000. **Bungalows,** $500–$2500. **Cottages,** $1000–$3000. Complete blue print drawings, working details, specifications and list of material at reasonable prices. Get this handsome **HOME BUILDERS' PLAN BOOK.** Send 25c coin or stamps.
Jens C. Petersen, Architect, 812 State Bank Bldg., Traverse City, Mich.

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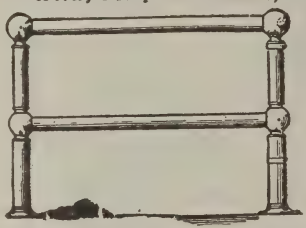
Of every description for Theatres, Churches, Offices, Etc.



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For Theatre Lobbies.
LET US BID ON ALL BRASS WORK
Inducing Prices, High Class Workmanship. Send us list of requirements.

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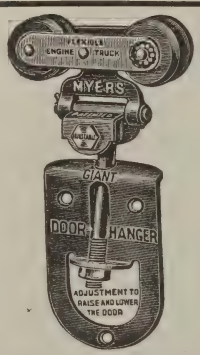

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PATENTED
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Are adjustable up or down, and in or out. Trolley Wheels are heavy turned steel, revolving on steel roller bearings, and run inside the tubular girder track. Not affected by rain, sleet or ice. Write for descriptive circulars and prices.

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are used exclusively in our book, **"Bungalows and Other Things,"** which contains photographs and floor plans of many artistic homes that can be built for $1,500.00 up. Get this book, it is the best of its kind on the market. Pick out the house you want and we will furnish the plans and specifications for $5.00 to $15.00. The book is receiving high praise from contractors and builders. **Price $1.00**

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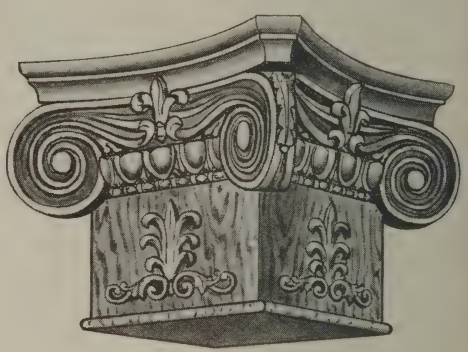
ordering planes direct. This offer includes a special discount provided the NATIONAL BUILDER is mentioned. We are informed by the Gage Tool Company that it is not at all unusual to receive orders for six or more planes at one time, each containing the well-known NATIONAL BUILDER dome.

Carpenters who have never tried the Gage self-setting plane will be surprised at the ease with which it does its work. The liberal introductory offers of the Gage Tool Company should lead them to investigate the merits of this tool, as the initial cost is small and there is no possibility of loss.

COLONNADES AND CAPITALS.

Catalogue No. 19 of the Chicago Grille Works, 826-838 Wells street, Chicago, Ill., contains a wide variety of illustrations showing modern grilles, colonnade openings, consoles, columns, etc. The system under which these various fitments are made permits their being arranged to suit almost any desired opening.

The enhanced value of a modern home enriched with decorations of this character is



Square Empire Capital.

apparent to all, whether for the individual use of the owner or whether it was built to rent or to sell. Far-sighted builders foresee the value of this high-class of trim. We show on this page a photographic reproduction of a square empire capital, which the Chicago Grille Company make in a number of sizes. This is only one of a large list of capitals, brackets, corbels, etc., which are carried in stock.

This catalogue can be obtained by writing to the Chicago Grille Company and asking to be informed of their methods of manufacture and selling.

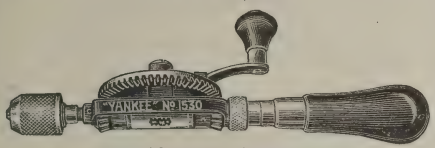
TOOL CABINETS FOR CHRISTMAS PRESENTS.

C. E. Jennings & Co., 42 Murray street, New York, have just issued a catalogue of tool chests and cabinets. Those who have secured a fine set of tools by individual selection scarcely realize the thought which must be expended in getting up a set of tools which

THE BEST CHRISTMAS GIFT

for most any man

is a "YANKEE" Tool



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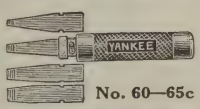

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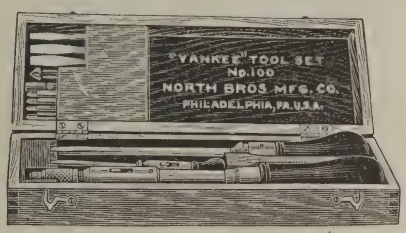

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They are unique, useful, up-to-date, and appeal to men of every profession and calling. A more substantial gift cannot be given. They last or years and your little act of kindness is remembered every time they are used.

Our Tool Book tells you all about thirty-four kinds ranging in prices from 25c to $5.00 each. A POSTAL BRINGS IT.

Your Dealer Sells "YANKEE" Tools

North Bros. Mfg. Co.

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Send for the Book—anyway

When Training Counts

"Yes sir, I've been with you going on five years and I think I deserve a raise."

You are right "up against it" when you ask for a raise if the only recommendation you have is "years of service." This will never get you anywhere. You must have special training; you must demonstrate to the boss that you are more valuable to him on account of this special training; on account of preparing yourself to fill the shoes of the man just ahead of you. Then if you can't get what you think you're worth, there are always hundreds of other jobs open to the trained man.

Length of service will decrease your efficiency rather than increase it. Five years ago you were a younger man; you had more ambition; you could do more work—you had something to look forward to. Today, if you have not been improving your mind, if you haven't been training yourself for a better job, you are in a rut—you have been grinding away at the same old job. Your employer may value your services, but you are probably worth only what he pays—no more.

How the American School will give you the training you need

The **American School of Correspondence** was established fifteen years ago for the benefit of ambitious men and women everywhere. This school makes it possible for you to obtain the education and training you need without leaving home or giving up your work. It will bring a practical college course to you right in your own home. No matter where you live, the **American School** will train you in any branch of **Engineering, Business and Law,** or prepare you for entrance into any resident college.

Write the **American School** now, while the subject of making more money is on your mind. State how far you went in the public schools, what you are doing now, and what you would like to be. Your case will receive special attention. The **American School** will tell you the best and quickest way to better your condition and get more money. Check the coupon and mail it now. Don't let this matter drag another day. Another year might slip by and find you at the same old job and prospects for a raise very slim.

NOTICE—The American School has been established 15 years and is not connected with any other school using the name "American." We do not employ agents.

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Check the course you want and mail the coupon now

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Please send me your Bulletin and advise me how I can qualify for the position marked "X." Nat'l Bldr. 12-12

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....Architectural Draftsman	....Cert'f'd Public Acc'nt
....Structural Engineer	....Auditor
....Concrete Engineer	....Business Manager
....Civil Engineer	....Fire Ins. Inspector
....Surveyor	....Fire Ins. Adjuster
.... Mechanical Engineer	....Fire Ins. Expert
.... Mechanical Draftsman	....Moving Picture Op'r
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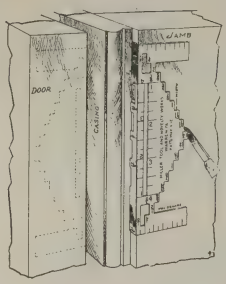
THE MILLER BUTT GAUGE



eliminates the tri-square, rule and the ordinary width and depth gauge in mortising for butts, locks, etc. on doors, windows, jambs, etc.

All markings are in plain sight. No scratching or cutting up of the finished woodwork. Always ready. No adjustments to make. Ask your dealer for it.

Price, 25 Cents Postpaid

M. W. MILLER
302 Penn Ave., East Warren, Pa.

OCEAN CITY BUNGALOWS

Send 75c for Book I containing plans and photographs of attractive, up-to-date and inexpensive Bungalows.

OTIS M. TOWNSEND, Bungaloist, Ocean City, N.J.

Are You Going to Build?

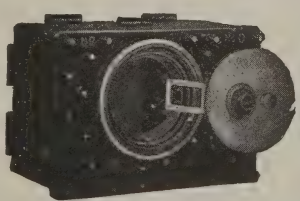
Send 25c (and 10c postage) For Our $1.50 Book No. 3

Originality, Personality, Individuality
IN HOUSES BUILT FOR HOMES

Ranging from $1500 to $4000

Estimates given are correct and we stand back of them. And are itemized, therefore specially adaptable for Contractors' use.

PIERRE LINDHOUT, Architect
716-720 Ashton Bldg., Grand Rapids, Mich.



The GALE WALL SAFE

It makes your Valuable Papers, Jewelry and Silver secure against Porch Climbers, Petty Thieves, Fire, etc.

No Home or Apartment House complete without one. It has a combination lock.

Write for Descriptive Matter Today

WILLIS MFG. CO., Galesburg, Ill.

FRED LIEBRICH, Agent for Cook County
1102 Monadnock B dg., CHICAGO, ILL.

shall include everything necessary for the busy carpenter without including a lot of unnecessary items. The various assortments which are shown in this catalogue seem to be very complete for the various purposes for which they are designed—from a simple household outfit to an elaborate and complete set of which no journeyman would be ashamed. These outfits make excellent presents for the beginner and the apprentice, as all of the tools are of the highest quality and are such as the expert workman selects.

To those whose tools are becoming badly worn, through long years of service, some of these outfits will particularly appeal. Others who have more recently secured their outfit will be interested in the pages devoted to empty tool chests and shoulder tool chests, etc.

FILMWOOD.

The growing scarcity of fine hardwood suitable for the highest grades of decoration first led to the use of veneers. It was soon found that by cutting the logs up for veneers a much better figure was obtained, and it was also possible to manufacture furniture trim, etc., with less liability to warping, checking, cracking, etc. The light weight of the soft pine core was an advantage, both for shipping and for every-day use.

Ordinary veneer is cut from one-sixteenth to one-twenty-eighth of an inch thick and can be applied only by a veneer expert. When properly applied, it is durable and can be given as fine a polish as the solid wood. The Cot-a-lap Co., Somerville, N. J., have designed machinery which will cut veneer much thinner than that in ordinary use. By their special methods, this veneer is mounted on a special backing in large sheets so that it can be applied to any surface, practically the same as wall paper. This product, Filmwood, can then be finished exactly like solid wood, although it is only a thin veneer cut from a high-grade log. Filmwood can be applied to wood, plaster, plaster board, asbestos, compo-board, sheet metal, or, in fact, any material having a smooth surface. It is an ideal material for panel surfaces, whether wainscot or ceiling. When applied over plaster or metal, it has the advantage of being practically fireproof, as the material is so thin there is little substance to burn. It is not an imitation wood—it is the actual wood cut from selected logs, and can be finished in any manner applicable to other woodwork.

Filmwood is now made by the Cott-a-lap Co. in figured mahogany, quartered oak and black walnut. This assortment of woods with the variety of stains and wood finishes now in use permits the decorator to give the greatest variety of effect.

The catalogue which the Cott-a-lap Co. are sending out contains samples of Filmwood in oak, mahogany and black walnut, as well as samples of burlap and other wall finishes made by this company. This catalogue, known as Circular X, will be sent to those interested in this novel material.

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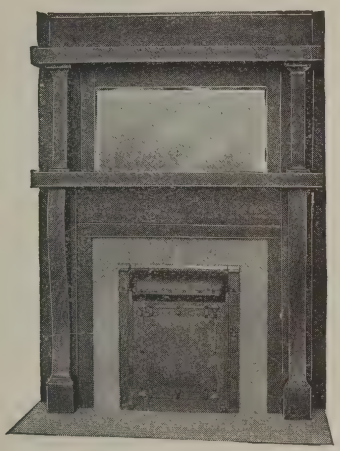
$28.60

For this Elegant, Massive Selected Oak or Birch

Mahogany Finished Mantel

Beveled Mirror, 18x36 inches



No. 875½

"FROM FACTORY TO YOU"

Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns as shown in cut. **Dealers' price not less than $40.00.**

"Reputation and Quality Count"

CENTRAL MANTELS

are distinctive in workmanship, finish and style. Twenty-five years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

CATALOGUE FREE. Will send our new 100-page catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

Central Mantel Company

1237 Olive Street St. Louis, Mo.

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WHETHER you expect to build or make repairs, now or later, by all means send for our magnificent new Catalog of Millwork and Building Material. It is the **biggest, best and most complete** book of the kind ever published. 3,000 superb illustrations and 8,000 **dollar saving** prices on up-to-the-minute building material of every kind, for every purpose are shown on its 176 pages.

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Buy direct from us—Everything in Lumber, Roofing, Flooring, Doors, Windows, Mouldings, Hardware, Paint, Tinwork—All at Even LESS Than Wholesale Prices. You Can Actually Save From 33⅓ to 50 Per Cent.

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1 Ply, 35 Lbs. $1.10 Guaranteed 5 Years
2 Ply, 45 Lbs. $1.35 Guaranteed 7 Years
3 Ply, 55 Lbs. $1.60 Guaranteed 10 Years
Rolls Contain 108 Sq. Ft.

Glazed Windows

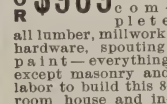
of all kinds ready for quick shipment.
2 light 68c up
4 light 77c up
12 light 83c up

FOR $1060 We will furnish complete all lumber, millwork, hardware, spouting, paint—everything except masonry and labor to build this 8-room house, and include plans free. Design **A135.**

1 light Stall Sash 34c
4 light Barn Sash 47c

All kinds of building hardware. You can't beat our goods or our wholesale prices

8,000 Bargains for YOU



FOR $969 We will furnish complete all lumber, millwork, hardware, spouting, paint—everything except masonry and labor to build this 8-room house and include plans free. Design **A101.** Surely this is a most tempting price for such a cozy home.

2 Big Free Books

Catalog and handsome illustrated Book of Modern Plans—shows floor plans, etc, Tells you how to save 33⅓% to 50% on all Building Material, Lumber, etc. Get these 2 big books at once—*today.*

Quality, safe delivery and satisfaction absolutely guaranteed.

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Chicago Millwork Supply Company
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Gentlemen: Please send your books to (if Plan Book is wanted enclose 10c)

Name.....

Address..... State.....

CATALOG No. 31. Building Materials
PLAN BOOK No. 41. House and Barn Plans

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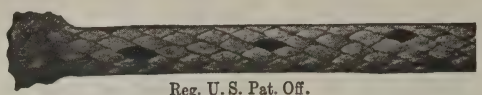
NAT. BUILDER

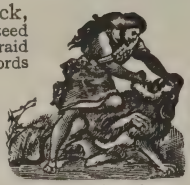
SAMSON SPOT SASH CORD



Reg. U. S. Pat. Off.

Made of extra quality stock, carefully inspected and guaranteed free from the imperfections of braid and finish which destroy common cords so quickly.

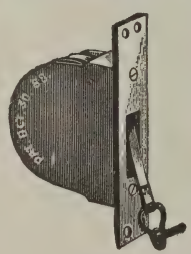
The Spots on the Cord, in any color, are our trade mark. Don't be misled by imitations. Samples and full information gladly sent.



Samson Cordage Works
Boston, Mass.

Reg. U. S. Pat. Off.

Caldwell Sash Balance



Does away with weights and cords and **vastly** more durable. Makes sashes work perfectly. Permits greater window space in new work, as box frames are not necessary. May be applied to old windows without altering sashes or frames.

Write for Circular to the

Caldwell Mfg. Company
2 Jones Street Rochester, N.Y.

BOVEE FURNACES
AT MANUFACTURERS' PRICES

Will prove to be very easy to install—durable and the most economical furnaces made. Special prices to Contractors and Builders on our five-room residence heating plants and also on our church and school furnaces.

Specify a Bovee Furnace and install it yourself. It will pay you to do it.

Write for Catalogue N

BOVEE GRINDER & FURNACE CO.
60 8th Street, WATERLOO, IOWA

"SYMPLIST"

Steel Sash Fixtures are easily put in place. No possibility of getting loose or out of order. Folder 57-B on request.

NIAGARA FALLS METAL STAMPING WORKS
Manufacturers of Hardware Specialties
NIAGARA FALLS, N. Y., U. S. A.

Sash Pulleys — Wall Plugs
Sash Chain — Wall & Veneer Ties

92

FINISHING CONCRETE SURFACES.

The owner of a building is the one most interested in the appearance of his building, as it will be after a term of years. The fact that it is possible to repair a building is not sufficient for the conservative owner. The exterior should remain in first-class condition through a long term of years.

The growing interest in stucco and cement exteriors for bungalows and more pretentious residences calls for a finish which shall be harmonious and durable. In the manufacture of "Stonekote," the Garden City Sand Co., believe they have a preparation of the greatest value to owners, architects, contractors, and builders. Being made in a number of different colors, it lends itself to a great variety of color schemes, and its impervious nature results in a surface which is both pleasing and durable. "Stonekote" can be applied on wood or metal lath, on brick, stone, or concrete, for exterior use, and can also be used to give a pleasing effect in interiors, such as basements, laundries, bathrooms, kitchens, etc.

The Garden City Sand Co., 709-11 Chamber of Commerce, Chicago, Ill., have color cards and other information regarding "Stonekote" and other preparations for builders' use. Those who are building houses with this form of exterior should write to the Garden City Sand Co. for complete information regarding these materials.

A CATALOGUE OF HARDWARE.

E. C. Stearns & Co., Syracuse, N. Y., are sending out their 1913 catalogue of hardware. This catalogue contains a great variety of tools, such as miter boxes, filing tools, saw vises, and sets, plane gages, clamps, scrapers, etc., as well as spring hinges, window screens, frames, sash balances, sliding barn door locks, coat and hat hooks, chest handles, handrail rackets, etc. A considerable section is devoted to cement workers tools, in which a wide variety of patterns is shown. A feature of this section is a key photograph of a modern residence showing in detail the various places where the various finishing tools are appropriately used.

Various other tools, devices, machinery and hardware are shown, which makes the catalogue a very complete hand-book for the contractor. We understand that this catalogue is sent free to such of our readers as mention THE NATIONAL BUILDER when writing for it.

SOUNDPROOF PARTITIONS.

The subject of partitions for fireproof buildings is one which has been given much investigation by municipal authorities. The necessity for some such provision is very apparent as it is extremely annoying to have sound passing from one room to another or from one apartment or office to another. Not only does the sound carry through the ordinary partition, but it is frequently possible to dis-

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

What Y' Doin' Now, Bill?

You don't have to ask that question of the **trained** man, because you know what he is doing—you know his position is a permanent one—and you know his position is one that pays a good salary. You also know that the **trained** man is not at the mercy of conditions that affect the untrained man.

You can always be sure of a good position and a good salary if you have the special training that puts and keeps you in demand. The International Correspondence Schools will bring special training to you, no matter where you live, or how little spare time or spare cash you have.

How many **untrained** men are constantly watching the "want" columns of the newspapers—only to be painfully reminded of the positions they can't fill and the work they can't do! Engineers are wanted; Mechanics are wanted; Electricians are wanted; Builders are wanted; Draftsmen are wanted; Advertising Men are wanted; and the Government offers big pay to those qualified for Civil Service positions. But there is seldom a chance for the **untrained** man. Because of his lack of training he must stay at uncongenial and unprofitable work.

For more than 20 years the I. C. S. have been helping men to qualify for more congenial occupations and better salaries.

To learn how the I. C. S. can help **you** and how you can easily qualify for success in your chosen occupation, mark and mail the attached coupon today. Doing so costs you only postage and will bring to you stories of success of thousands of I. C. S. students. You assume no obligation in asking for information.

But Mark the Coupon NOW

International Correspondence Schools
Box 1332, SCRANTON, PA.

Please explain, without further obligation on my part, how I can qualify for a higher salary and advancement to the position, trade, or profession before which I have marked **X**.

Architecture	Mechanical Engineer
Architectural Draftsman	Patternmaking
Contracting and Building	Civil Engineer
Structural Engineer	Surveying and Mapping
Structural Draftsman	Commercial Illustrating
Concrete Construction	Mining Engineer
Electrical Engineer	Gas Engineer
Electric Lighting	Automobile Running
Plumbing & Steam Fitting	Bookkeeper
Heating and Ventilation	Stenographer
Plumbing Inspector	Civil Service Exams.
Estimating Clerk	Advertising Man

*Name*_____

*St. and No.*_____

*City*_____ *State*_____

*Present Occupation*_____

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

New Catalog Just Issued

Get Our Prices on Millwork and Lumber, Hardware, Paints, Roofing Wall Board, Etc.

"QUALITY" House Paint

Price per Gallon Can $1.17

Just the right ready-mixed House Paint of highest quality. Formula printed on the label. Our Paint Department can save you big money. We carry *everything* in Paints, Oils, Varnishes, Stains and Painters' Supplies.

One Thousand Feet of Roman Wall Plaster Board $22.50

Warmer, Cleaner, Stronger Than Lath and Plaster

Roman Wall Board is non-inflammable, with a rock plaster composition center between two thicknesses of very heavy fiber board. Easy to apply direct to studding. Takes kalsomine, paint, wall paper or burlap. Used for interior walls and ceilings in new buildings. Vastly superior to lath and plaster.

Colonial Dining Room China Closet or Buffet

This splendidly designed and carefully built China Closet, complete with hardware and glazed, ready for installation, is furnished in Yellow Pine for . . **$25.92**

Price in Red Oak, complete as above, $28.82. Top section is built to fit opening from 6 ft. 8 in. to 7 ft. high. It stands 32 inches high to top of countershelf.

We carry other styles in stock, to correspond with Mission or Craftsman interiors.

Quick Shipment, High Quality and Safe Delivery Guaranteed

Send for the Big Catalog and make up a trial order under the above guarantee of satisfaction or your money back.

We have been doing business with carpenters and contractors throughout the country for many years. We want your *regular business, year after year*, and the basis on which we expect to get it is "*delivering the goods.*" Write us.

GORDON-VAN TINE CO.

635 FEDERAL ST., DAVENPORT, IA.

225

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Let Us Fill That Next Order!

Let's get together on that next order of Building Material. We come to you with a plain, straightforward proposition to ship Millwork, Lumber or special material, of *guaranteed quality*, at much *less* than you have been paying. *And furthermore*, we will positively agree to *refund every dollar* and pay both freights if you are not *entirely satisfied*.

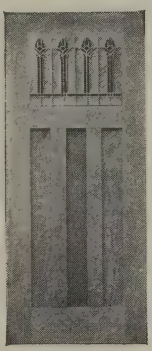
We are financially responsible for any obligation we may enter into, and our record for fair dealing, high quality of product, prompt service and *low prices* is *an open book*.

You run *no possible risk* in "trying us out" by sending us your next order. Give us the opportunity to *estimate* on your next order and to *fill it* if the *price* is in *your favor*.

Let us send you our big new catalog, just off the press.

Our Big Catalog Offers 5,000 Bargains Here Are a Few "Snap Shots" From It:

"Craftsman" Veneered Red Oak Door



Style "D" Craftsman Door is made of Veneered Plain Red Oak, with three sunken panels. Glazed in a rich design of Art Nouveau Glass, set in metal. Craftsman Trim consists of Oak Casing and Back Band. One of the finest specimens of the "Craftsman" style ever evolved.

Size 3 ft. wide x 7 ft. high, 1¾ inches thick. Price **$9.85**

Solid Yellow Pine 5-Panel Door

Size 2.8 x 6.8 x 1⅜ in. Our price . . . **$1.95**

Made from Southern Selected Yellow Pine, thoroughly kiln-dried and of superior workmanship.

These doors finish very handsomely.

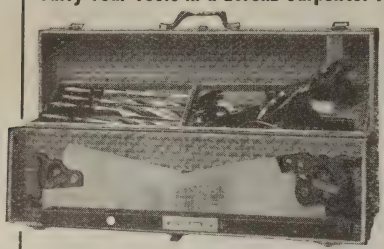
We carry an enormous stock of all regular sizes and styles, in Oak, White and Yellow Pine, Cypress, Fir, etc. Lowest prices in America.

GORDON-VAN TINE CO.

635 FEDERAL ST., DAVENPORT, IA.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Carry Your Tools in a Lorenz Carpenter Fiber Tool Case



when going or coming from work. It will add to your good appearance and be more convenient. **Lorenz Fiber Tool Cases** are made of three ply basswood, covered with first class vulcanized fiber, which will not tear. Heavy brass corners and trimmings, trays for planes, chisels, bits. Place for saws, level and square. Inside measure 32x16x7. **Write for Price. You will like the Lorenz Cases. They are the finest made and guaranteed.**

WM. LORENZ TRUNK WORKS, 109 2d St. So., Minneapolis, Minn.

THE NEW "COMPLETE" SAW SET

A glance at this cut will convince you that every practical, common sense feature is embodied in this tool. A few of which are: Adjustable side gauge which brings the point of each tooth under the anvil. Top Clamp Screw when adjusted, regulates the amount of set. The setting or wearing surfaces are made of Tool Steel and carefully hardened. Front Screw holds down Saw, allowing free use of left hand. Compact, attractive and low in price. Black, 75c. Nickel, $1.00. Order of your dealer or a sample will be sent on receipt of price.

OTIS A. SMITH, ROCKFALL, CONN.

SHINGLING HATCHETS

WITH POSITIVE GAUGE

No. 144

OVAL HEAD. 169 POINTS.

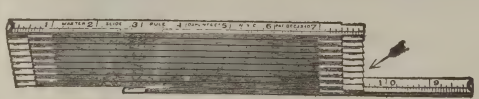
Gauges by ¼ inches from 4¼ inches to 5½ inches. Full Polished Solid Tool Steel, the best Quality ever used in a Hatchet.

If your dealer does not carry these Hatchets we will send you one, express prepaid, upon receipt of $1.75.

L. A. SAYRE & SON

340 Mulberry St., NEWARK, N. J.

The Master Slide Rule



is the only Rule in the World whereby inside measurements of doors and windows, etc., can be taken rapidly and accurately. It is also far superior to any other rule for outside measurements of walls and ceilings, etc., as it can be extended and closed instantly. **Mechanics, Buiders, and Architects, try one today! Don't wait!**

On receipt of 15 cents per lineal foot, a 4, 5, or 6 foot rule will be sent to you prepaid. Large profits to agents. Write for circulars and particulars.

DAHL MANUFACTURING COMPANY, A 1 East 42nd Street, NEW YORK CITY

tinguish the words spoken on the other side of the partition.

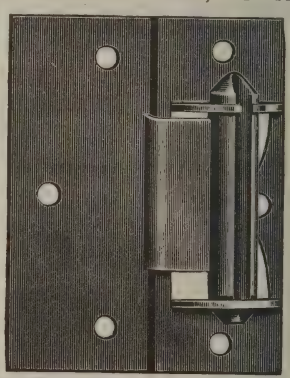
With the intention of reducing the amount of sound and vibration which is carried from room to room, Samuel Cabot of Boston, Mass., made many investigations and experiments. It was found that by the use of Cabot's "Quilt," the vibration and sound was greatly reduced and in fact the "Quilt" was several times as efficient as a solid plaster partition. For this reason Cabot's "Quilt" is generally used in music studios and other places where there is excesive vibration.

It stands to reason that what will deaden the sound will also serve as an insulator against heat and cold. For this reason we see Cabot's "Quilt" used for covering the walls of frame buildings, lining floors, etc., where it is desired to secure the greatest protection against the weather.

The many ways in which Cabot's "Quilt" can be used and some of the many purposes for which it has been used are shown in the circulars and catalogues sent out by Samuel Cabot. Those of our readers who have work of this character to do and who are required to build warm houses should obtain these catalogues and other information regarding Cabot's "Quilt" and see for themselves the many advantages in its use.

HARDWARE NOVELTIES.

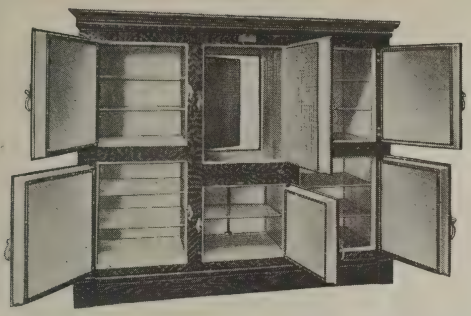
The carpenter who is always on the lookout for the newest devices and household equipment can do nothing better than be posted on the materials manufactured by the Diehl Novelty Co., Sheboygan, Wis. This enterprising firm has a plant equipped with the latest improved machinery for making storm sash and screen hangers and fasteners, sash locks, base-



Diehl's Separable and Reversible Storm and Screen Door Hinge No. 20.

ment window hinges and catches, screen door hardware, and a number of other novelties on which they control the patents. This catalogue is of interest to the contractor and carpenter and in view of the comparatively dull times during the winter it would seem wisdom on the part of the mechanic to have this catalogue with the idea of keeping busy during the winter months and being prepared for the spring rush. This catalogue is sent free and will be found valuable and instructive.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



HERRICK DRY AIR SYSTEM

REFRIGERATORS

Never fail to prove their superiority of ice consumption, sanitary features and fine appearance.

WRITE FOR CATALOGUE N. B. 21

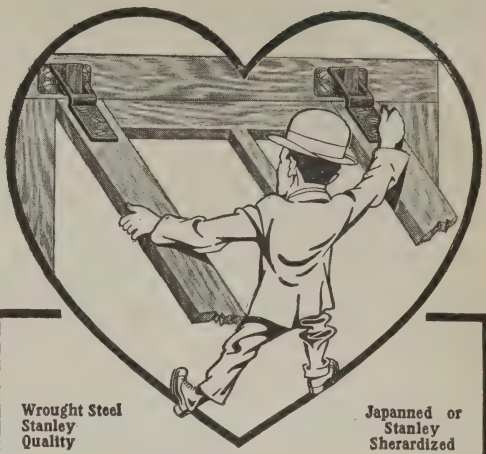
giving full description of this especially designed refrigerator—with OUTSIDE ICING ARRANGEMENT which is so much appreciated by every owner—and also showing the full line of Herrick's Residence, Apartment, Grocery, Hotel and Cafe Refrigerators.

You will find them right in every part

Write now for the Catalogue

HERRICK REFRIGERATOR CO.

WATERLOO, IOWA



Wrought Steel Stanley Quality

Japanned or Stanley Sherardized

"Peerless"

Storm Sash Hangers and Fasteners

Just what you want to hang your Storm Sash correctly. Once applied no tools are needed to take down or put up the sash. Full length screens can be hung on the same hooks.

The Fasteners hold the sash firmly in place while either open or closed.

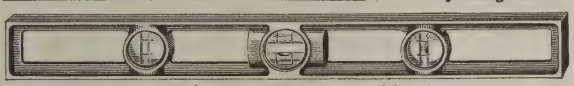
Write for Circular "N."

THE STANLEY WORKS

New Britain, Conn.

The Largest Line of Levels Made

In Plain Brass-Bound and Aluminum
Anything Made to Your Order



No. 24. 24-inch Aluminum Reversible All-around

MFD BY J. SAND & SONS TRADE SANDS MARK PLUMBS & LEVELS DETROIT, MICH.

No. 18. 18-inch and 20-inch Long Wood Level

MADE BY MEN WHO HAD 25 YEARS' EXPERIENCE IN THE BUILDING LINE

See that Name SAND Is on Your Level as There Are Many Cheap Imitations

SAND'S Plumbs and Levels

The new model aluminum levels now offered for sale to all carpenters and builders as the handiest and most useful levels ever made. They are **Strong, Light and Durable,** and will give better satisfaction than any other level made. The spirit glasses are covered by plate glass, same as in our famous wood levels, of which there are over 75,000 in daily use, making those parts dust, dirt and water proof. The only levels so designed. Remember our specialty is levels—nothing else. Established for 17 years. Nothing to get out of order. Always correct. For sale by all good hardware dealers. If not, write us and get our catalog today.

J. SAND & SONS 1021 Rivard St. Detroit, Mich.

The Typewriter as a Perpetual Investment to the Architect and Contractor

Fox Model No. 24

Fox Typewriter Company

4410-4710 Front Ave., Grand Rapids, Mich.

The typewriter has made possible the enormous business development of this country.

Fox typewriters can be made a perpetual investment to any Architect or Contractor and if persistently used will double the business of the average man in six months' time. **Read how.**

We will sell you our latest Fox Visible Typewriter, Model No. 24, for a few dollars down, if time is wanted, and the balance $5:00 monthly. Make a list of prospective builders in your vicinity. To each of these write frequent, but short, personal letters. Call attention to some particular building you have just designed or erected and ask the party to inspect it. Show the advisability of buliding at this particular time—materials are lower—help more easily secured—weather conditions favorable. Don't overlook the fact that the great mail order houses of the cities are hard after the small home builder—and they'll get his order, too, unless you adopt their progressive methods by starting a personal letter mail campaign.

This is too big a subject to handle in an advertisement, but it is too important to be neglected by you. Write us today for full particulars, catalog, etc. Now, before you forget it.

The National Builder Enquiry Coupon

Name_____

Address_____

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT. BUILDER

Direct from the Manufacturer

A Wonderful Paint Offer

If any of your buildings need painting, write at once for our free paint sample offer. We sell the best ready mixed paint in the world at lowest prices ever heard of—65c a gallon for the best Barn Paint, $1.15 a gallon for the finest House Paint in quantities. We pay the freight charges. **Guaranteed for Ten Years.** We furnish full directions how to do any job, and just now we are making a surprisingly liberal offer. Write at once and get this great paint offer, *free shade samples*, strong testimonials and valuable paint information. Just say "Send me your latest paint offer." Address

Crosby-Frank & Co. 297 Peoria Street, Chicago, Ill.

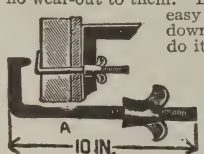
$13.95 PER DOZ.

(If You Send Cash With Order)

The Taylor Steel Scaffold Bracket

Absolutely Safe,

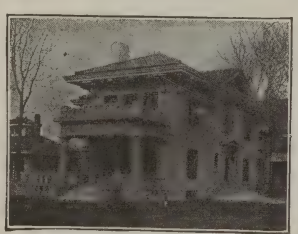
for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.



Write for Catalog of Builders' Specialties

James L. Taylor Mfg. Co.
Poughkeepsie, N. Y.

143 Cities Used "STONEKOTE" Rough Cast In 1911

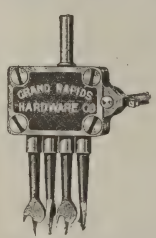


Before you build or repair the old home have your architect write us for book telling of "Stonekote" Portland Exterior. What color would you like a sample to be; Gray, Silver Gray, White, Buff, Red, Brown?

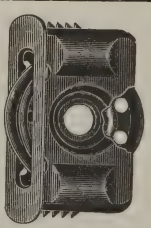
M. C. Clapp Res., Wichita, Kan.

THE GARDEN CITY SAND COMPANY
MANUFACTURERS
709-11 Chamber of Commerce CHICAGO, ILL.

HAVE YOU POWER BORING MACHINES?



Quadruple Bit. Price, $5.00
Can not be used in a hand brace.



No. 110 Cone Bearing

If so, no Sash Pulley can be classed with the

CONE BEARING No. 110

Mortised at one punch with the **Quadruple Bit** or bore four holes with a single bit and it's done.

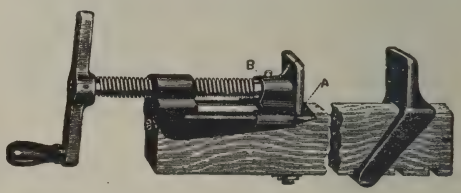
No cutting, fitting nor trimming. Saves time and money. Write for free samples.

Grand Rapids Hardware Co.
118 Pearl Street, Grand Rapids, Mich.

THE SHELDON CLAMP.

The cut on this page shows one of the several styles in which the Sheldon clamp is made. Over one hundred thousand of these clamps are now in use and the merits of the Sheldon design are universally recognized.

This cut shows one of the latest cabinet clamp fixtures designed to attach to wood

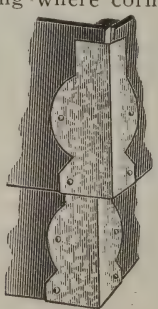


bars 1¼x2½ inches in any length. When made up in this way they form the strongest and yet the lightest and most easily operated wood frame clamps which can be had at any price. The design of the sliding head is such that there is no bending strain on it when clamping irregular or thin material, and the head can not turn when pressure is applied. It is also impossible for them to get loose, out of line, or split the wood to which they are attached.

The latest catalogue issued by E. H. Sheldon & Co., 178 Nims street, Muskegon, Mich., shows a large number of other styles of clamps for special work, such as horse clamps, parlor frame clamps, mitre clamping vises, etc., as well as rapid action woodworkers' vises, and other labor saving devices for the woodworker and cabinet maker. This catalogue is sent free on request.

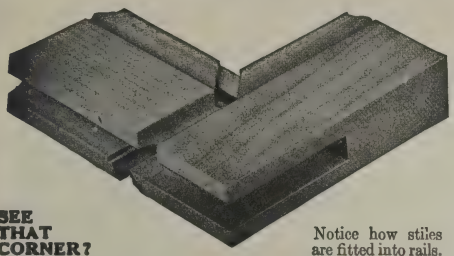
METAL BUILDING CORNERS.

One of the hardest places for a carpenter to finish and one which quickest shows the action of the weather is on the corners of the building where corner boards are not desired. To make a neat joint requires that the siding shall be mitered and the shrinkage of the material soon opens up an unsightly joint. When shingles are used for covering the sides of the building, the effect is the same, the shingle opening up and frequently exposing the sheathing boards beneath.



The Kees Metal Building Corner was designed to overcome troubles in this position. As will be seen from the illustration, it consists of a metal corner of neat design which covers the corner and which can be finished the same as the siding. The protection at this point is well worth the slight cost of these corners, and the time saved by their use will more than pay for them on any job. The F. D. Kees Manufacturing Co., Box 811, Beatrice, Neb., who manufacture this metal corner advise us that they will send a free sample to contractors and builders on request, as well as their complete catalogue of building specialties.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



SEE THAT CORNER?

Notice how stiles are fitted into rails.

MADE TO ORDER

Fly Screens and Screen Doors

We use the best grades of wire, black enamel, galvanized, pearl and copper bronze, fastened by the improved **Standard Shoulder Strip Method,** which makes the wire drum tight and firm, can not sag or pull away.

Dealers, Carpenters, Contractors and Builders, write for a free copy of our 1912 illustrated catalog

STANDARD SCREEN CO., 1848-50 W. 14th Street Chicago, Ill.

Our screens are all mortised, tenoned, joined with waterproof glue and pinned with steel pins, will last a lifetime

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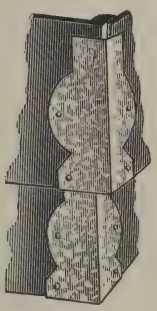

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A modern construction handbook, indispensable to the professional man and the student of today.

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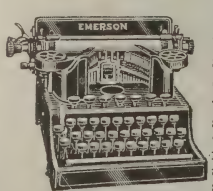

Show this wholly visible typewriter to your friends and let them see wherein it **excels any $100 Typewriter made,** if we would send one to you **Free of One Cent of Cost** for you to keep forever as **your own?** Then on a postal card, or in a letter to us simply say: Mail particulars.

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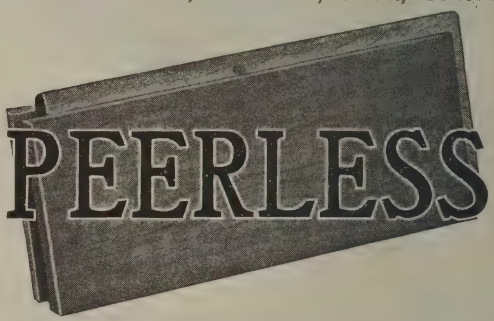
The best place to make hardwood flooring is near the forest where the timber grows. For this reason, the Northwestern Cooperage and Lumber Co., Gladstone, Mich., believe



that they are fortunately situated to turn out the highest quality of Rock Maple, Beech and Birch flooring. Owning their own nearby forests, and with mills and manufacturing plant, they have at all times complete control of this situation. Their "Peerless Flooring" is believed by them to represent the highest grade in hardwood flooring.

The Northwestern Cooperage & Lumber Co. have an interesting booklet on the subject of hardwood flooring, which contains facts regarding the manufacture and care of this material. It is sent free to our readers and should be given careful consideration.

THE SMITH HAND MIXER.

Some contractors believe that hand mixed concrete is almost as good as machine mixed. Sometimes it is, but the chances are against it. When the contractor has a comparatively

small amount of work to do, it becomes a serious problem for him to mix the concrete by machine. His machine will mix half a yard or so, where he wants to use two or three cubic feet, and as a result, he tries to get along with a hand mix rather than keep his big machine going. Then, too, he may have a job such as sidewalk work where he will require only a few feet of concrete in a place. With a big machine, this means frequent moving and the efforts of several men to keep the mixer near the work.

The T. L. Smith Co., 1336 Majestic building, Milwaukee, Wis., are well known as manu-

Main Part of This Roof is 24 Years Old; The Addition 6 Years; "You Can't See Any Difference"

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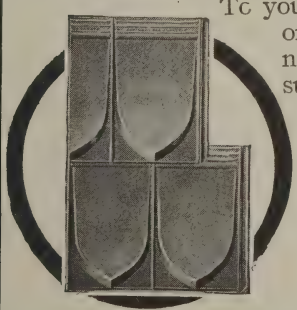
GENTLEMEN:—A portion of the home of Dr. I. N. King, Barstow, Md., was built about 24 years ago and covered with *Cortright Metal Slates*. About six years ago we built an addition to it, and also covered it with your roofing and today you cannot see any difference between the roofs.

Yours very truly, LYONS & GIBSON.

Consider This:—Dr. King Decided Upon

CORTRIGHT METAL SHINGLES

for the addition to his building, after having been protected by them from storm, wind, fire and lightning for eighteen years.



To you, as a contractor, this remarkable satisfaction not only helps increase your business, but really eliminates competition by giving you an article far superior to all other forms of roofing.

Let us tell you how we work with you in developing business. **Write us right now for our special offer to Contractors and Builders.**

Cortright Metal Roofing Company

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MAIL US THIS COUPON NOW

You may send me book "Concerning That Roof" as advertised in N. B. 11-12.

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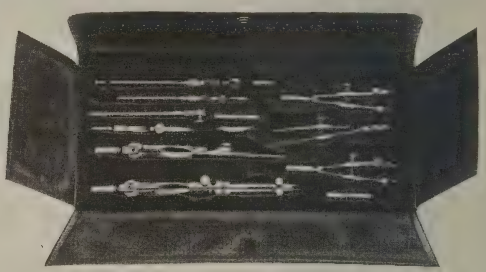
facturers of high-grade concrete mixers. One of their styles is small enough for the smallest job and is designed to be worked by hand and readily moved from place to place. For this reason it is particularly valuable in repair work, sidewalks, footings for small buildings, etc. This model is fully described in catalogue No. 18, which every concrete worker should have.

DRAWING INSTRUMENTS.

The progress which has been made in commercial lines has been equalled in many branches of the building line. Methods of manufacture, as well as the design of draw-



ing instruments have been carefully considered by a number of the prominent manufacturers of these goods, and the resulting good qualities of the instruments are due to their care and foresight.

The Knight-Rohan Company, 301-305 Osgood building, Racine, Wis., have been manufacturing drawing instruments, surveying instruments, and supplies for architects, blue printers, etc., for a number of years. The methods by which they sell their drawing equipments direct are novel and extremely satisfactory from the customer's point of view. By their methods, it is possible for their customers to exchange one set of instruments as soon as they wish to get a more elaborate one, and they are allowed the full cost value for their old set.

This progressive company is at present featuring a special set of instruments for builders, as well as a smaller one for beginners. Both of these sets are of exceptional value and would make most acceptable Christmas presents for anyone in the building line. The guarantee which the Knight-Rohan Company gives is extremely complete and their offer is to refund the money should the purchaser not be entirely satisfied.

The catalogues of the Knight-Rohan Company show many articles of interest and this catalogue should be in the hands of all our draftsmen and designers.

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The greatest need of the contractor in the building field today is machinery and tools developed to the highest possible earning power. The increased rate of wages, the shortening of the hours, and the demand for the rapid completion of buildings becomes each year more pressing on the contractor and renders it more and more necessary that the

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Don't get so much absorbed in the ornamental architectural possibilities of RED GUM that you will overlook the fact that SAP GUM (from the same tree) is the best wood on earth for a finely finished job of White Enamel or as a base for stained wood effects in infinite variety.

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Liquid and Color
to be mixed as needed to make Woodlife Shingle Stane produces a wood coating that is both preservative and decorative. It costs too little to imitate and is better than any substitute. Easily applied. Color cards and prices on request.
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USE the "HAN-COT" Sash Mouse for placing sash cord in window frames.
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contractors' equipment be of the very best. Efficiency of machinery will go a long ways toward offsetting the increase in cost in other ways. Those who have given much thought to the development of machinery for contractors' use believe that there is machinery devised which will greatly aid the contractor in the prosecution of his work.

The Waterloo Cement Machinery Corporation, 111 Vinton street, Waterloo, Iowa, has devised a great deal of machinery for the contractor's use, such as their Little Wonder and Polygon Mixers, their Builder's Hoists, Block Machines, Stone Crushers, etc.

The complete catalogues of these various machines are more than mere descriptions, as they show in great detail the construction, the particulars of their use, and contain much other information valuable to the general contractor. These catalogues should be in the files of all of our readers interested in advance in all equipment.

FIREDOOR HARDWARE.

The latest rules of the Underwriter's Laboratories regarding firedoor equipment calls for very careful manufacture of the doors and equipment and rigid requirements as to installation. While there are a number of styles of doors which meet the requirements those made by the Richards-Wilcox Mfg. Co., 115 3rd street, Aurora, Ill., seem to be particularly well designed for the purpose.

Not only must the door work easily, but it must be at all times ready to close automatically in case of fire. The Richards-Wilcox Co. have recently issued a catalogue of firedoor hardware which shows the several styles of firedoor fixtures, tracks, hinges, etc., as well as instructions for installation. This catalogue is of value to the architect in designing the building, to the contractor in erecting the work; and to the owner as showing exactly what is permitted by the Board of Underwriters and what is recognized as the last word in fire protection. This valuable catalogue is sent free on request to the Richards-Wilcox Company.

FIVE THOUSAND BARGAINS.

When one starts to build a house, they readily believe that there are five thousand things to be considered. Before the house is finished, the number of items mounts up close to the millions, and the average owner when he gets through with his first house knows little more about building than when he started.

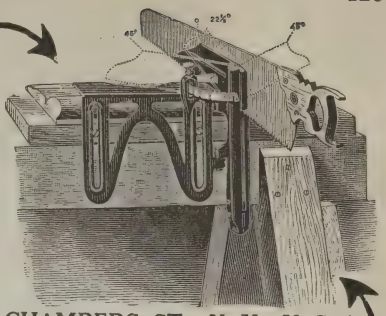
The average contractor must constantly be on the lookout for the new things that are coming out, in order to be posted on his client's wishes and on the best way to give his client the most for the money.

The Gordon-Van Tine Co., 632 Federal street, Davenport, Iowa, have listed five thousand bargains in their latest builders' catalogue. On many of these items, they claim that the builder can save fifty per cent and be assured of high-grade materials and prompt service. So sure are they that the contractor will be satisfied that they offer, in case of dis-

It's a 2 Pound Mitre Box

But it does more and better work in less time than any other mitre box made.

It's the "RED DEVIL" Seaver Patent



Mitre Box. It will cut any angle with any saw. It folds up and can be carried in your tool chest. It's always ready; has no extra parts and a child can adjust it instantly. It's the most practical appliance of its kind in the world. Over 125,000 sold and in use today. Your local hardware man sells it. Ask for the **"Red Devil,"** but if you can't get it locally, send us $2.00 and your dealer's name and one only will be sent you prepaid.

Red Devil Glass Cutters—the best in the world—sold everywhere

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Get them and you will notice the difference in your accounts.

Standard Boring Machine

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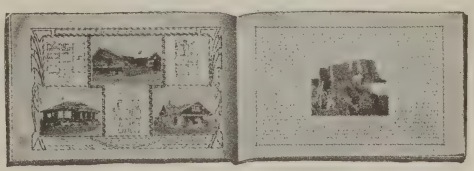
Be the Bungalow Man
OF YOUR TOWN



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The Bungalow covered with **Red Cedar** Shingles from "crest to foundation" has come to stay. Everybody likes it. Can be stained in any color to harmonize with surroundings. Stain costs only half as much as paint and is put on in one-half the time. You stain a bungalow once in five years while you paint clap-boards twice.

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Our Bungalow Book contains Photos and Floor Plans of genuine Pacific Coast Bungalows. Every Contractor, Carpenter and Architect should get a copy. Full of up-to-date ideas and designs.

Red Cedar Shingle Mfrs. Association
Representing Over 200 Mills — Daily Capacity 20 Millions
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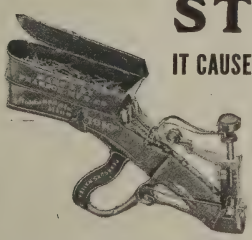
IT CAUSES SERIOUS DISEASES OF MOUTH AND STOMACH



Pearson's Automatic Shingle Nailer will carry nails in a sanitary way—and at the same time make it possible for you to drive more nails—do it with gloves or mittens on—and save you money on every job—works well on roofs of any pitch—holds between 500 and 600 nails.

PEARSON NAILERS are made in two sizes.

The Blue Nailer is for common 3d, No. 14 gauge wire nails and the Red Nailer is for the **galvanized** 3d, No. 13, 1¼ in. wire nails. Order from your dealer or send **$5.00** for either one—express prepaid. Money cheerfully refunded if Nailer is not as represented. *Write for Circular "N."*

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made from the famous Michigan hard maple by the latest improved machinery and methods. All stock is carefully selected, thoroughly kiln dried, side and end matched, hollow backed, bored for blind nailing and so smoothly polished that it makes a floor of unusual beauty.

Handsomely illustrated book telling all about hardwood flooring mailed free. Specify Diamond Hard and buy it from your dealer. It is right in price and quality.

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Paint Your Concrete and Brick Buildings with TOCH BROS.

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"Remember It's Waterproof"

and your cement floors with **TOCH BROS. Cement Filler** and **Floor Paint**, Pat'd. Proof against Water, Acid, Fumes or Alkali. **Special elastic compound for each specific purpose**

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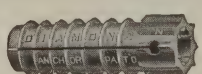
For fastening all kinds of material to brick, stone or concrete



Diamond "N" Shield

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Last a Lifetime and Give Satisfaction to the End!

The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalog. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book, "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

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satisfaction, to refund every dollar paid and pay the freight both ways on the unsatisfactory material. Nothing could be fairer than this.

The Gordon-Van Tine methods are well known through their frequent mention in the NATIONAL BUILDER. The facilities which Gordon-Van Tine Co. have for getting out and shipping material are equalled by few concerns in this country. Their book of "Five Thousand Bargains," which they offer to send free to our readers, will be a revelation to those who are not familiar with their methods, and should be on every contractor's desk.

HOLLOW CONCRETE BUILDINGS.

The best judgment of the practical man leads him to seek a practical machine making a product which is practical for the purposes for which it is used. The use of hollow concrete building blocks has been the result of a rapid growth in popularity of this form of construction, and it is only natural that many ideas should have been put forward which were not entirely practical from all standpoints. Given unlimited material and labor, it would be, of course, possible to secure certain results, but for the economical production of concrete building blocks the subject must be carefully considered and the items of material, construction of the machine, labor required and method of manufacture be closely looked into.

The Ashland Steel Range & Manufacturing Company, Ashland, Ohio, have for several years manufactured a machine for making hollow concrete building blocks. Their experiments in this regard and the investigations which they have made of the subject lead them to believe that their system meets all the requirements of the practical man. Their machine is so made that the face of the block is at the bottom of the mold, which permits the greatest pressure to be brought upon the wearing surface and also permits any style of decoration desired, it being only necessary to introduce face plates having the required ornamentation.

In order to reduce the weight of the blocks and economize in the materials the blocks made by these machines are made hollow without detracting from the strength of the block. In fact, when properly made concrete blocks will stand practically the same pressure as brick or stone, without rupture. In some recent tests of concrete blocks the material stood a pressure equal to a pile of blocks nearly half a mile high without fracture.

The United States standard machine, as made by the Ashland Steel Range & Manufacturing Company, is also adapted for making all sorts of special shapes, such as circular locks, sills, cornice, water tables, etc., thus making it extremely adaptable for the purpose of the contractor. The recent catalogues of this machine show in great detail the construction and some of the classes of work to which it is adapted. Every concrete worker should have it in his files.

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FALSE WORK NO LONGER NECESSARY

Berger's Ferro-Lithic Reinforcing and Furring Plates

represent one of the simplest and least expensive methods of reinforcement for concrete floors, walls, etc. Due to the cross-ribbed, dovetailed, keystone formation, they not only are exceedingly strong and stiff, but afford excellent plastering surface on either side. They may be placed on a building for some time without plastering or concreting. This means that the building may be erected at any time or season, but the plaster and concrete not applied until the weather is favorable. This is only one of the good points of Ferro-Lithic

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Also manufacturers of Metal Lumber, Prong Lock Studs and Furring, Rib-Trus, Metal Ceilings, Expanded Metal Lath, Sidewalk Forms, Raydiant Sidewalk Lights, etc.

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Don't be satisfied for a minute until you have written for a free sample of

Winthrop Asphalt Shingles

A roofing with class and character to it—made of solid asphalt, into the surface of which is rolled under heavy pressure, fine chipped slate or granite.

The appearance is rich and beautiful—colors are red and green—the natural color of the slate or granite—won't fade or wear off.

Winthrop Asphalt Shingles are very durable—easy to lay—fire resisting—light as wood shingles and low in cost.

Winthrop Asphalt Shingle Co.

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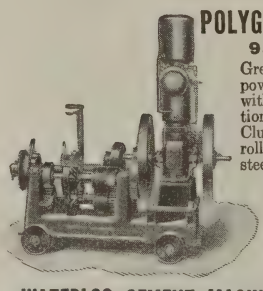
Dumb Waiters
Carriage and Store Elevators
Sidewalk Hoists, etc.
MECHANICALLY PERFECT
State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. WRITE TODAY.
Sidney Elevator Mfg. Co., Sidney, Ohio

IMPROVED QUICK & EASY RISING Steam, Electric and Hand Power Safety—
ELEVATORS
and Dumb Waiters, Automatic Hatch Gates. SEND FOR CIRCULARS.

KIMBALL BROS. CO.
COUNCIL BLUFFS, IOWA

MR. CARPENTER AND BUILDER! WHY NOT MAKE some extra money?
by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **Rolling Ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.
It is only necessary te send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.
Write for Catalogue
Milbradt Manufacturing Company
1442 N. Eighth Street ST. LOUIS, MO.


POLYGON BUILDERS' HOIST
95% EFFICIENCY
Great lifting capacity in ratio to power. Reverses drum or sheave with engine running one direction. Patent Quadruple Helix Clutch. Cone friction. Cold rolled steel shafting. Semi-cast steel base and standards in one piece. Rigid, durable, simple. Steam, gasoline or electric power. All the advantages of others and then some. Don't fail to investigate the POLYGON before buying a hoist.
WATERLOO CEMENT MACHINERY CORPORATION
111 Vinton Street, WATERLOO, IOWA

HARDWARE SPECIALTIES.

The Caldwell Manufacturing Company, 2 Jones street, Rochester, N. Y., have been manufacturing sash balances for nearly twenty-five years. This length of time has proven to their satisfaction that their designs meet with the approval of the conservative contractor, owner and architect.

While some insist upon double hung sash with weights, etc., there are some places where these cannot be used to advantage, such as in old buildings or where the mullions are narrow or the window wide for its height. In such places, the Caldwell Sash Balance is of especial value.

This same company manufacture aluminum-bronze sash ribbon, which they claim is the strongest metal known to science and is soft, pliable and non-corrosive.

The complete catalogue of the Caldwell Manufacturing Company contains many other specialties of interest to the builder, architect, and house owner.

TAYLOR BUILDING SPECIALTIES.

The James L. Taylor Manufacturing Company, Poughkeepsie, N. Y., are manufacturers of a long list of specialties of great interest to the contractor and builder. One of the most important of these is their scaffold bracket, which is made entirely of steel and so constructed that it is practically indestructible. The method of attaching to the building prevents any possibility of working loose and causing an accident.

These brackets are made reversible so that it is possible to use them in many places where the ordinary bracket would be impossible. As they carry a ton each, there is little chance of their ever being overloaded.

The Taylor Company also manufacture roofing brackets, ladder brackets and ladder trimmings, as well as a number of other specialties of interest to the progressive builder.

NEW DATA ON PIPE INSULATION.

For the information of architects and others interested in securing a cheap and efficient form of insulation for cold water pipes, the following results obtained from tests recently made by Professor Charles L. Norton of the Massachusetts Institute of Technology should prove valuable.

Professor Norton measured the heat transmitted through J-M anti-sweat pipe covering of 1 inch thickness and 1½ inches thickness, respectively; also through 2½-inch thick J-M special built-up frostproof covering.

The heat transmission through the 1-inch J-M anti-sweat covering was found to be 0.008 b. t. u. per degree per square foot per minute. The transmission through the J-M anti-sweat covering, 1½ inches thick, 0.007 b. t. u. per degree per square foot per minute, and through the J-M special built-up frostproof covering, 0.0037 b. t. u. per degree per square foot per minute.

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Full Line of Plumbing Supplies

Sold Direct at Wholesale Prices

20 to 40 per cent Saving

Complete bathroom outfits—tubs, closets, lavatories, kitchen sinks, etc. Prompt shipment from a complete stock. The only house selling up-to-date, guaranteed goods at wholesale direct. Write for illustrated catalogue and prices.

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and you will find we can save you lots of money on anything in the line of HIGH-GRADE sash, doors, frames, blinds, mouldings, inside trim, grilles, colonnades, stair and porch work, mantels, grates, tiling, art glass, paints, roofing and building papers, wall boards, hardware, hardwood and parquetry flooring, rolling partitions, screens, steel ceilings, gutters, shingles, etc.

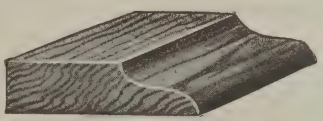
WINDOWS
42c and up

Our new catalog mailed free will convince.

Prompt shipments and materials all first-class.

Let us send you our SPECIAL FIREPLACE CATALOG—showing unusual values.

The Huber Builders Material Co.
39-43 Vine Street CINCINNATI, OHIO



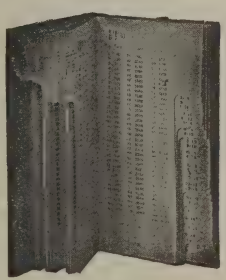
WINDOW BEAD
Best Yellow Pine
27c per 100 lineal feet.

ROOFINGS
64c and up

STAIR NEWELS
$1.50 and up

HARDWOOD MANTELS
$3.58 and up

PORCH NEWELS
42c and up



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$1.00 is mighty cheap insurance against the losses due to faulty lumber estimating. No man can possibly carry in his head the number of feet in any number of pieces of all the different sizes of lumber. Errors are bound to happen more or less frequently, and one such error means a loss of many times the cost of **The Perry Lumber Reckoner.**

The Reckoner is a carefully prepared pocket edition of tables of lumber showing the number of feet in any number of pieces in a given size, fully indexed so that you can turn instantly to the right page. When you buy this book you do so with the understanding that we'll cheerfully refund your money if the book is not entirely satisfactory. Don't delay. Send us your name, address and $1.00 and get the book prepaid.

BENJ. L. JENKS, Pub., 906 Williamson Bldg., Cleveland, O.

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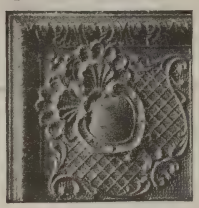

Are you figuring on using a medium priced Steel Ceiling? Get our catalog by all means. It shows a line of beautiful ceilings of sufficient variety to please almost any individual liking, yet at prices surprisingly low.

The possession of this catalogue and a knowledge of our line and prices will save you many a dollar if you are an occasional or frequent buyer of Steel Ceilings.

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INDIANAPOLIS CORRUGATING CO.
Indianapolis, Indiana

ROCK MAPLE FLOORING

The highest grade of seasoned Rock Maple Flooring made. It makes a perfect floor—the kind that builds the Contractor's reputation for high class work. "Peerless" flooring is also carried in Beech and Birch. Specify "Peerless" if you want complete satisfaction.

The Northwestern Cooperage & Lumber Co., GLADSTONE MICH.
Branch Office: Lumber Exchange, Minneapolis, Mich.

CONSOLES, COLUMNS, and GRILLES

add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.

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It contains many beautiful designs of Consoles, Columns and Grilles

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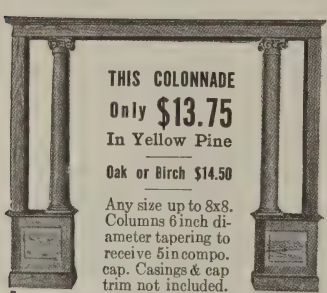
Office and Showroom, 1824 Milwaukee Ave., CHICAGO



THIS COLONNADE
Only $13.75
In Yellow Pine

Oak or Birch $14.50

Any size up to 8x8. Columns 6 inch diameter tapering to receive 5in compo. cap. Casings & cap trim not included.

THIS is positively the best Colonnade for the price in the market today. Take advantage of this special offer. Quality, satisfaction and safe delivery guaranteed. Order today. Give exact width and height of opening. State what kind of wood.

Our Catalogue No. 35 shows many new designs Write for it.

Bertelsen Adjustable Grille Co.
615-617 So. Clinton St., Chicago

These tests show that J-M anti-sweat pipe covering 1 inch thick is perfectly satisfactory for preventing outside cold water pipes from sweating and for covering refrigerated drinking water lines; also that when these lines pass through heated rooms the 1½-inch material will give excellent results. For protection from freezing in very low temperatures the results obtained from the J-M special built-up frostproof covering prove that it possesses the highest degree of efficiency with the greatest economy of cost.

All of the pipe covering materials mentioned in this article are made by the H. W. Johns-Manville Company, New York City.

KEEN KUTTER TOOL CABINETS.

Every mechanic wishes to keep his tools in the very best shape, and whether in his shop or on the job, the care given to tools is amply repaid by the better work they will do. Many carpenters and mechanics have their own little shop or workbench at home where their tools should be kept carefully put away when through using them. To these the Keen Kutter Tool Cabinets are especially interesting, as every tool has its place in the cabinet and they are kept in first-class condition, ready for use at all times.

The Keen Kutter Tool Cabinets are for sale generally by the better class of hardware dealers, but if the nearest dealer does not have the size or outfit desired, a line to the Simmons Hardware Co., St. Louis, Mo., will bring complete information, catalogues, etc., regarding their complete lines.

BUILT-UP VENEER PANELS.

In nearly every building, whether of the bungalow style or the more ornate residence, hotel or office building, there are numerous places where it is desired to cover comparatively large surfaces with some wall covering other than plain plaster. In such places as wainscoting and paneling, it is especially desirable that a fine quality of wood be used and that it be so prepared that there is no likelihood of swelling, warping, twisting or deteriorating. In practically all cases the sizes in which this paneling must be made varies with the building and with its location in the building, and nearly all of this class of work must be made up special.

The American Veneer Co., 433 Market street, Kenilworth, N. J., are specialists in the manufacture of built-up veneer panels for architectural and interior woodwork. By their method of manufacture any kind of wood may be used for the exposed surface, and the panels may be made in any desired size. Particular attention is paid to matching the grain for adjoining panels, and, if required, arranging the entire order so that all of the work will join harmoniously. So much of this work is used in modern buildings that the facilities of the American Veneer Co. are exceptionally good for turning out the highest grade of work.

Contractors and builders who have work of this character should correspond with the

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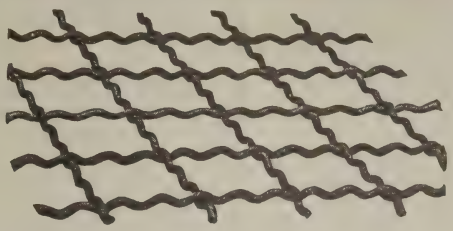

The Kind You Want Because It's Right in Every Way

WIRE CLOTH

Buffalo Crimped Wire Reinforcement, plain or galvanized, is the original reinforcement for concrete from which all other styles were evolved. It has lost none of its popularity, however, as it is the only material which can be made to suit any or all individual requirements, there being no limit to the different sizes of mesh and wire in which it can be woven.

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Plain or galvanized wire lathing, Grimm's Galvanized Corrugated Wire Lathing, Greening's Patent Trussed Steel Wire Lathing, Buffalo Wire Fencing, etc., etc. All of these products embody points of construction which make them superior to anything else in their lines. Send for our Catalog No. 5. It is fully descriptive.

ARTISTIC METAL WORK

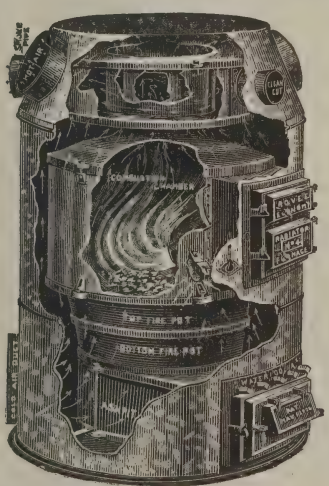
Samples and prices of Wire Cloth, Wire Work or Metal Work submitted upon application.

Buffalo Wire Works Company

formerly Scheelers' Sons

442 Terrace, Buffalo, New York

Bovee Furnaces at Manufacturer's Prices



Bovee's Economy Furnace.

Saves 50 per cent of Cost; 40 per cent of Fuel. Most Durable, most Economical Furnace Sold. Has a perfect ventilating system for every part of building.

RESIDENCE HEATING PLANT

Hot air registers in five rooms, cold air return in two rooms, 40 in. Furnace, 20 in. Fire Pot, 28 in. Combustion Chamber, 10,000 cubic ft. Heating Capacity.

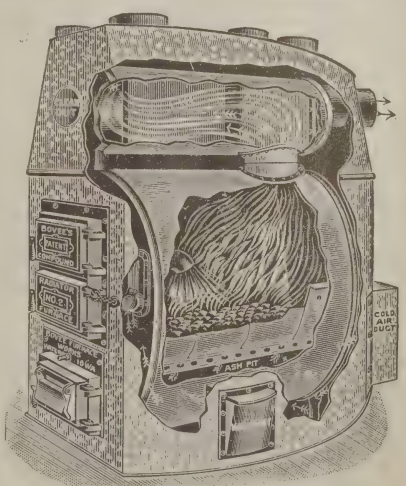
Special Price, $65.00

CHURCH AND SCHOOL HEATING PLANT

One large hot air, two cold air registers, 54 in. Furnace, 32 in. Fire Pot, 40 in. Combustion Chamber, 40,000 cubic ft. Heating Capacity.

Special Price, $95.00

Horizontal Furnaces with large doors or larger furnaces and more piping at proportionately low prices.



Bovee's Horizontal Furnace.

SEND FLOOR PLANS FOR FREE ESTIMATE

Bovee Grinder and Furnace Works, 60 8th Street, Waterloo, Ia.

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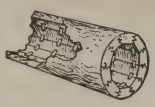
LOOK INSIDE!

SEE THOSE STAPLES.



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DO STAY LOCKED

They're different—made to last and cost no more than inferior columns. Insist on having them—you'll not regret it.

Write for Catalog F—A beautiful free design book worth owning.

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Specialists and Manufacturers of

BUILT-UP VENEER PANELS

For Architectural and Interior Woodwork

Made up to your exact specification as to size, thickness, kind of wood required.

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PHOENIX INSIDE SLIDING BLINDS

Comfort : Convenience : Economy

The lately patented springs and corrugated steel rods put the "Phoenix" far in lead of less improved styles.

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PHOENIX SLIDING BLIND CO., PHOENIX, N. Y.

NEW CATALOGUE ON FINE CABINET WORK READY FOR YOU

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You will like our high class materials and workmanship. We carry a large stock of kiln dried lumber in both soft and hard woods, and can get orders out promptly.

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Let's get together now—We know we can please you.

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21st Place & Loomis St. Chicago, Ill.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

American Veneer Co. and obtain samples of their work showing the care with which the veneers are built up.

OAK FLOORING GRADING RULES.

The increasing use of Oak Flooring has led the Oak Flooring Bureau, 897 Hammond building, Detroit, Mich., to consider carefully the grading rules under which it should be manufactured and sold. The grades recognized by this bureau require that it shall be known as clear, sap clear, select, No. 1 common and factory. The specifications in regard to the different grades are as follows:

QUARTER-SAWED.

Clear—Shall have one face practically free of defects, except ⅜ of an inch of bright sap; the question of color shall not be considered; lengths in this grade to be 2 feet and up, not to exceed 10 per cent under 4 feet.

Sap Clear—Shall have one face practically free of defects, but will admit unlimited bright sap. The question of color shall not be considered. Lengths in this grade to be 1 foot and up.

PLAIN SAWED.

Clear—Shall have one face practically free of defects, except ⅜ of an inch of bright sap; the question of color shall not be considered; lengths in this grade to be 2 feet and up, not to exceed 10 per cent under 4 feet.

Select—May contain bright sap, and will admit pin-worm holes, slight imperfections in dressing; or a small tight knot, not to exceed 1 to every 3 feet in length; lengths to be 1 foot and up.

No. 1 Common—Shall be of such nature as will make and lay a sound floor without cutting. Lengths 1 foot and up.

Factory—May contain every character of defects, but will lay a serviceable floor with some cutting. Lengths 1 foot and up.

THE USE OF THE DIFFERENT GRADES.

Clear Quarter-Sawed—High class residences, hotels, apartment houses and club houses.

Sap Clear Quartered—An economical substitute where a dark finish is desired. This grade is equally as durable a floor as the Clear grade.

Clear Plain Sawed—High class residences, hotels, apartment houses, churches and club houses.

Select Plain Sawed—Medium priced residences, hotels and apartments: Schools, office buildings and stores.

No. 1 Common—Cheap dwellings, tenements, stores, high class factories and manufacturers buildings.

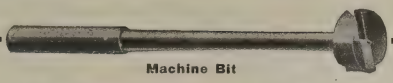
Factory—Warehouses, factories and cheap tenements.

STANDARD THICKNESSES AND WIDTHS.

$\frac{13}{16}$-inch thickness; widths 1½-inch face, 2-inch face and 2¼-inch face.

⅜-inch thickness; widths 1½-inch face, and 2-inch face.

Tongued and grooved and end matched.


Machine Bit

A BIT OF UTILITY

Guided by its circular rim—instead of its centre—the Forstner Labor-Saving Auger Bit will bore any arc of a circle and can be guided in any direction.

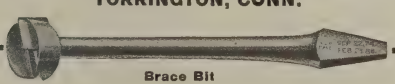
Doesn't matter how hard the wood is, no consequence whether it is full of knots, or the grain awkward to negotiate. The Forstner Bit works with equal smoothness under any condition and leaves a true polished surface on every job.

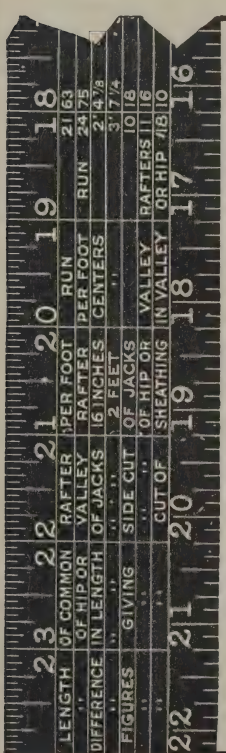
UNEQUALED FOR DELICATE WORK

Supersedes chisels, gauges, scroll-saws, or late tools combined, for all kinds of delicate work. Cabinet and pattern makers and carpenters are enthusiastic because they do more work than other bits and cost no more.

We can offer something special in the matter of price on sets packed in a sensible box. Send today for particulars and catalog.

THE PROGRESSIVE MFG. CO.
TORRINGTON, CONN.


Brace Bit


LENGTH OF COMMON RAFTER PER FOOT RUN 21 63
" OF HIP OR VALLEY RAFTER PER FOOT RUN 24 75
DIFFERENCE IN LENGTH OF JACKS 16 INCHES CENTERS 2 4/8
" " " " " 2 FEET " 3 7/4
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Every Carpenter knows the ordinary lengths and cuts of rafters—it's the odd ones he cannot remember.

Our rule not only gives the lengths and cuts of rafters to frame the seven ordinary pitches of roof, but it gives the lengths and cuts of rafters for SEVENTEEN DIFFERENT PITCHES OF ROOF.

Send for our LITTLE BOOK explaining this rule. It's free.

Nicholls Mfg. Co.
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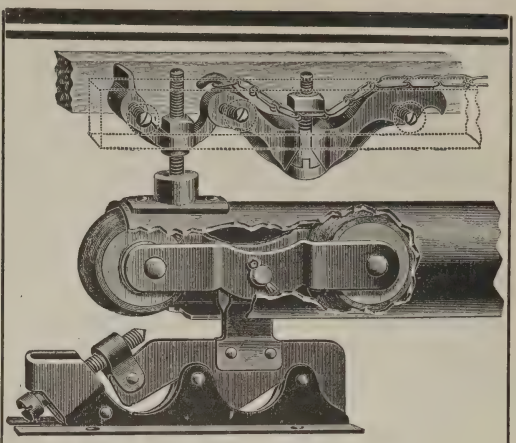
Fig. 404

Correctly Hung Doors
Are the Last Touch of Perfection

Cannon Ball Hangers insure ***permanent*** satisfaction. Both hanger and track easily adjustable with an ordinary screwdriver, and both are instantly accessible from the center of the door opening, allowing either end of track to be raised or lowered as desired.

The CANNON BALL
House Door Hanger

Specially formed wheels with roller bearings—wide tread — leather covered. Frictionless, noiseless, practically indestructible. Steel hanger and plate for attaching to door.

Track of 14 gauge steel 2¼" inside diameter, slotted ¼" on under side.

Furnished complete with two-piece hardwood header.

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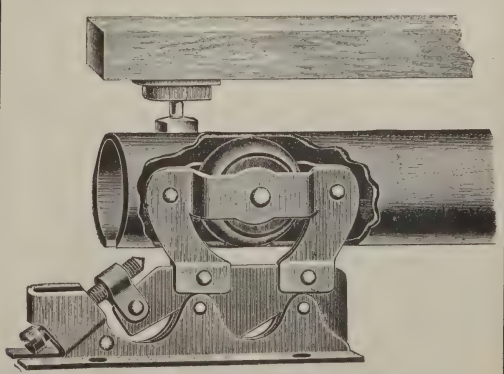
Fig. 468

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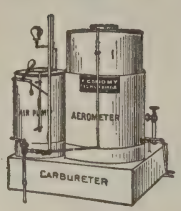
Automatic Safe-Sanitary Gas Light and Fuel



Best for cooking and heating water for kitchen, bath and laundry.
No charging, no cleaning.
No generating, no dirt, soot, fuss or muss.
Cheaper than electricity, cleaner and safer than kerosene or acetylene (in use 16 years.)

Today is the time to write HOME department of

ECONOMY GAS MACHINE CO.
504 Cox Building Rochester, N. Y.

THE STEEL SQUARE

Two Volumes. A practical treatise on the use of the Steel Square. By Fred T. Hodgson. 600 pages, 500 illustrations. The author was the first—really the only—to write on this important tool, and the two volumes contain the easiest as well as the latest method of using the **Steel Square** for the solution of the many problems in building construction. The two volumes are of the greatest value to the young carpenter. Single Volume, Part I, cloth....$1.00
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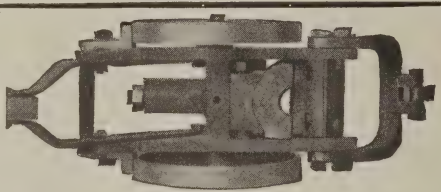
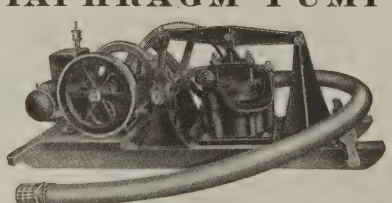


The "Boss" Self-Adjusting Floor Scraper

The knife will adjust itself to any floor. The knife is attached to the shaft, which lets it give in frame. The "Boss" is the only Floor Scraper made that will plane a floor without leaving a square cut. The "Boss" can be set for any thickness of shaving. It also can be set for any shearing, right or left, up or down, to suit the kind of lumber.

Factories, Dwight, Ill. (London, Canada.) **G. J. KEPPLINGER, Main Office, Dwight, Ill.**

DIAPHRAGM PUMPS



For Contractors and Builders

These pumps, connected with our gasoline engines, furnish the most efficient method known for pumping out sewers, manholes or trenches. Ask us for No. 21 Bulletin.

BATES & EDMONDS MOTOR CO., Lansing, Mich.

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AN IMPORTANT IMPROVEMENT IN ROOFING.

The roofing bugaboo is done for. The everlasting fear which every one has that his roofing may need a new coat of paint, which he hasn't time to give to it, is disposed of by the coming of Amatite Roofing.

This new type of roofing has a mineral surface made up of particles of crushed rock embedded into a tough pitch in such manner that it forms a flexible concrete surface. This surface needs no paint of any kind; it will stand wear year after year without deterioration.

The man who owns an Amatite Roof never thinks about painting. Not only does he save his peace of mind on the subject but he saves money, too, because Amatite costs no more than painted roofings and the elimination of painting expense makes it in the end the cheapest of all ready roofings.

Many owners of buildings have never seen a mineral surfaced roofing that was practical, and so the manufacturers have arranged to supply free samples to anybody who inquires. If you are interested in the subject send for a sample, addressing the nearest office of the Barrett Manufacturing Company, New York, Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburgh, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle.

THE MODERN WALL MATERIAL.

The broad field for satisfactory wall board to be used in place of lath and plaster has brought out a number of articles of more or less merit. Most of these do well in certain conditions, which are particularly favorable to them. One of the companies which have made extensive experiments in this field is the Bestwall Manufacturing Company, 1247 First National Bank building, Chicago, Ill., and their tests have led them to place "Bestwall" on the market.

One of the disadvantages of the old style lath and plaster is the fact that it creates a large amount of rubbish in the house and requires the addition of a large volume of water, which must dry entirely out before it is possible to bring in any of the finishing material. In "Bestwall" all of this work is done in the factory, the material being complete when ready to nail in place. "Best wall" is a mineral composition so that it is not subject to expansion or contraction, as with wood or wood products. For this reason it is possible to apply wallpaper direct to the surface without danger of cracking at the joists.

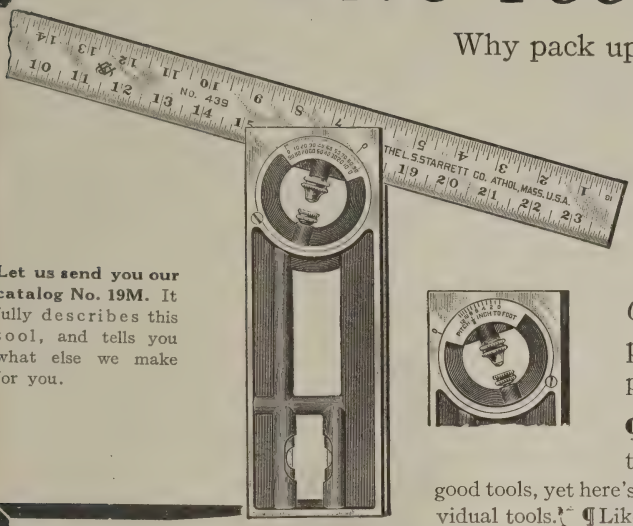
The finished surface of "Bestwall" is adapted for the direct application of washable paints, calcimine, etc., and there is no chance of fading or staining, as the surface of "Bestwall" contains no chemicals.

"Bestwall" is manufactured in large sheets in a variety of sizes, which makes it particularly adaptable for practically any size room, the width being as a rule in multi-

Five Tools In One

Why pack up and carry five tools when one will do as well? The

Starrett Builders' Combination Tool



Let us send you our catalog No. 19M. It fully describes this tool, and tells you what else we make for you.

One tool—serves as an improved try square, a level, a plumb, a depth gage and a bevel.

¶ Although *you* don't haggle over the cost when purchasing really good tools, yet here's a chance to save the price of the individual tools. ¶ Like all products bearing the name "Starrett," the accuracy and finish and convenience of this Builders' Combination Tool are not unexcelled.

THE L. S. STARRETT CO., ATHOL, MASS.

(42-19)

REHM'S REHM'S

CARPENTER MOUSE CHAIN

48 inches long, fitted at one end with patent sash cord fast, at other end with lead weight.

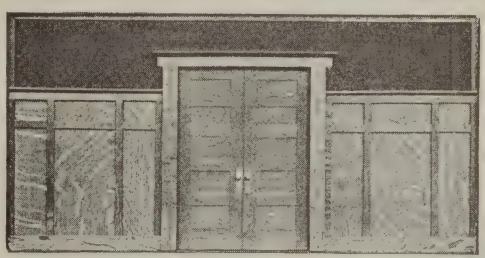
Price 30 Cents Postpaid

FREE

Our No. 5 Builders' Hardware Catalog and Net Price List.

We do not sell to contractors or carpenters in Cook County, Illinois.

REHM HARDWARE COMPANY
1503 Blue Island Ave.
Chicago, Ill.



HARDWOOD PANELING

AT ¼ USUAL COST

Filmwood

OAK, MAHOGANY, WALNUT

A Real Wood Veneer
::Mounted on Paper::

Enables paper hangers to make panel work, wainscots, dadoes, entire walls. No need to call in carpenter. Finer grain effects than thick lumber. Good for fireproof construction. Stained, filled or polished same as thick wood.

Send for Circular N

We also make "Magic" and "Bull Dog" Wall Size and Cott-a-lap Sun-proof Burlap.

The Cott-a-lap Company

Main Office and Mill—Somerville, N. J.
Chicago Office—108 W. Lake Street

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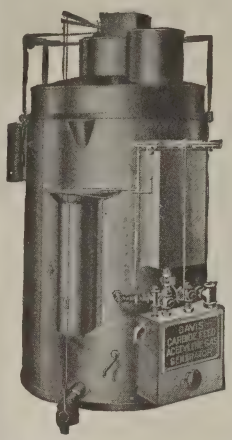
Mr. Contractor and Builder



Why not equip the home or other building you are erecting with

Davis Acetylene Lighting?

Superior to Private Electric or Gasoline Lighting

Let us tell you how

You can greatly increase your income by selling and installing Davis Acetylene Lighting Systems for new buildings and during dull seasons for buildings already erected. No previous experience required and we help you get started.

Write us for cost of equipping a building and for our terms to salesmen.

Architects desire to recommend the best and we, therefore, invite them to carefully investigate what we have to offer.

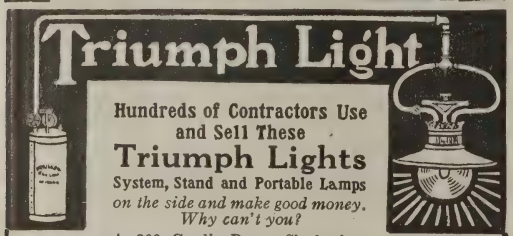
Davis Acetylene Company 35 Prospect Street ELKHART, IND.

MAKE $150 TO $300 PER MO.

Secure the Agency for the Gloria Lighting Systems, Table Lamps, Self-heating Irons, Bathroom Outfits and Hot Water Heaters. Lighting Systems for homes, stores, churches, that light instantly. Anyone can install and operate in two hours' time. Table Lamps for library or parlor. Self-heating Irons cost less than 1 cent per hour to operate. Saves steps and the over heating of the kitchen. Send for our catalogue and full particulars.

Gloria Light Company
1266 Washington Boulevard
Chicago, Ills.

Triumph Light



Hundreds of Contractors Use and Sell These

Triumph Lights

System, Stand and Portable Lamps

on the side and make good money. Why can't you?

A 300 Candle Power Shadowless Light that can be turned up and down like gas. They meet all requirements of Home, Store, Church or business lighting, in or outdoors, at less than half the cost of kerosene or electricity; simple enough for anyone to install and operate.

Write for N. B. catalog, it tells all about them.

BRILLIANT GAS LAMP CO.

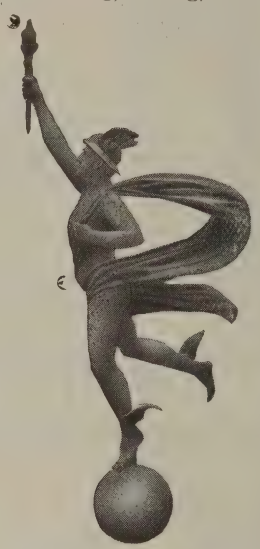
Dept. 49, 182 N. State St., Chicago, Ill.

ples of 16 inches. The spacing meets the regular joist spacing without cutting.

The Bestwall Manufacturing Company have an interesting booklet, giving the many more advantages of "Bestwall" and also showing photographs of rooms in which it has been installed and suggestions for finishing various other places. This booklet is sent to our readers upon request.

ORNAMENTAL SHEET METAL WORK.

The latest catalogue of the W. H. Mullins Co., 210 Franklin street, Salem, O., contains a great variety of sheet metal products such as roofing, siding, cresting, finials, etc., for the exterior of building. A large number of designs for store fronts are shown, giving one an excellent idea of the variety of artistic effects which can be produced in sheet metal. The section devoted to stamped metal statuary is of great interest, as it shows lifelike representations of numerous animal forms adaptable to various positions about a building.



The up-to-date contractor will be interested particularly in the hollow metal fireproof windows, of which photographs are shown before and after testing these windows in the Underwriter's Laboratories at Chicago, Ill. It will readily be seen that a building protected with windows of this character is practically proof against any outside fire hazard and will also protect adjoining buildings from any fire originating in the building. At the same time, it will be possible to see what is going on inside the building and if necessary, the firemen can readily make a small hole through the wire glass of the window, and thus use their hose while being protected.

The W. H. Mullins Co. advise us that they are very successful in selling goods direct from their catalogue and the contractor and builder should have their catalogue for reference in ordering, as it contains much valuable information which can be used by the up-to-date contractor.

Advertisers' Section.

No. 19.—Has 2 Levels, 1 Plumb, 24 inches long, 3 inches wide, 1¼ inches thick, Brass Bound. Price, each, $2.00

Start right now. Don't wait. Buy **MAYES BROTHERS LAKE LEVEL.** They are made of the best selected White Pine and are light and durable. All glasses are stationary set so no fall or jar can move them.

Write at once for booklet illustrating the most complete line of Plumbs and Levels made.

MAYES BROTHERS, Makers of RELIABLE LAKE LEVELS **694 Medbury Ave., DETROIT, MICHIGAN**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The roof that stays proof

To make a roof *lastingly* waterproof lay roofing made of Trinidad Lake Asphalt.

The natural oils of this asphalt give life to

Genasco

THE TRINIDAD-LAKE-ASPHALT

Ready Roofing

That is why Genasco lasts.

Mineral or smooth surface. Several weights. Ask your dealer for Genasco. Write us for the helpful Good Roof Guide Book and samples—free.

The **Kant-Leak Kleet**, for smooth surface roofings, makes seams waterproof without cement, and prevents nail-leaks.

THE BARBER ASPHALT PAVING COMPANY

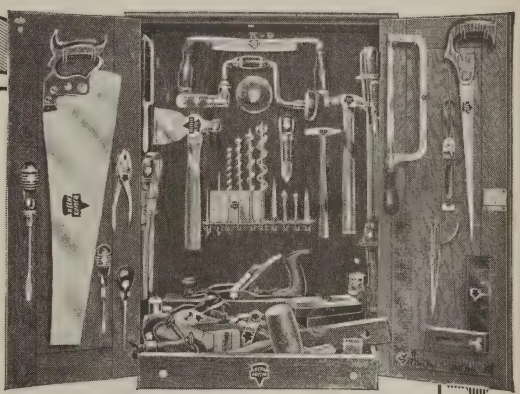
Largest producers of asphalt, and largest manufacturers of ready roofing in the world.

PHILADELPHIA

New York San Francisco Chicago

Fine Tools in a Cabinet

The short cut to a fine collection of tools—to a real Christmas gift—is to buy a Keen Kutter tool cabinet. Here are all the highest quality tools to do any kind of work and a place for every tool so it can't get loose and nick fine edges.



No. K9—Complete with 50 Highest Grade Tools, etc. Price $35.00

KEEN KUTTER
Tool Cabinets

repesent the *only* line of guaranteed tools. Every tool carries the specific Keen Kutter guarantee just the same as the Keen Kutter tools bought separately. Every tool must be exactly as *you* desire or *money back* from your dealer. Keen Kutter tool cabinets range in price from $8.50 to $125.00. All Keen Kutter tools are of one quality—the finest produced. Prices vary according to number of tools and size of cabinets.

"The Recollection of Quality Remains Long After the Price is Forgotten."
Trade Mark Registered. —E. C. SIMMONS.

If not at your dealer's, write us.

SIMMONS HARDWARE COMPANY, Inc.,
St. Louis, New York, Philadelphia, Toledo, Minneapolis, Sioux City, Wichita.

E. C. SIMMONS KEEN KUTTER TRADE MARK REG. CUTLERY AND TOOLS U.S. PAT. OFF.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

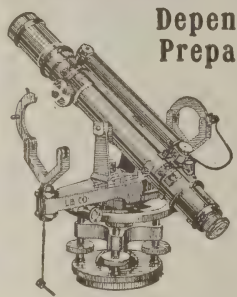
CARPENTERS, you may not need a STEEL TAPE often, but when you do need one you need it bad, and you need an ACCURATE one, a

LUFKIN STEEL TAPE.

CATALOG ON REQUEST

THE LUFKIN RULE CO. Saginaw, Mich. New York

REMEMBER—Tomorrow's Success Depends Upon Today's Preparation



Prepare yourself and secure a

BECKMANN INSTRUMENT

The first element of success is **accuracy.**

Our instruments are all guaranteed accurate.

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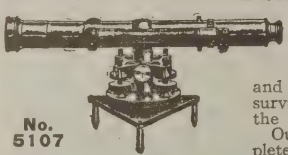
THE L. BECKMANN CO.
100 Adams St. TOLEDO, OHIO
Established 1874

Architects' and Builders' Levels



No. 5107

We manufacture every requiste of the engineer for field and office work and build a special type of surveying instruments for the architect and builder. Our catalogue lists a complete stock of drawing, mathematical and surveying instruments and measuring tapes.

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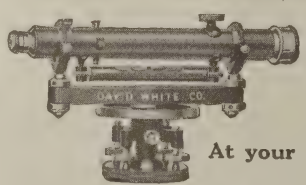
KEUFFEL & ESSER CO.

NEW YORK 127 Fulton Street — General Offices and Factories HOBOKEN, N. J.

Chicago St. Louis San Francisco Montreal, Can.



STOP GUESSING!

At your work and use

White's Improved Level

and know your work is accurate. Satisfaction guaranteed or money back. Don't delay—Write for Catalogue and Special Prices.

DAVID WHITE CO., Inc. 421 E. Water St., Milwaukee, Wis.

DIAMOND RAPID FIRE DRILL.

There are many places in construction where it is impossible to place the sleeves for expansion bolts or other fastenings at the time the the concrete or masonry is put in. It is, therefore, necessary to drill into the concrete, brick, or stone work to insert the expansion bolt shields and similar devices. This work has formerly been done laboriously with a hammer and hand drill, the nature of the masonry being such that no other tool has heretofore been found suitable and serviceable.

The Diamond Expansion Bolt Co., 90 West street, New York, have designed a drill which reproduces the same action as the hammer and drill, but with greatly multiplied speed. The hammer's action upon the drill, and the drill's action upon the stone is identical to that produced in the old way with the ordinary hammer and steel drill, but it is performed by turning a crank practically the same as in the well-known breast drill.

It is well known that a hard blow is not necessary in drilling concrete or masonry, but rather a number of light blows. The Diamond drill is regulated to strike a proper blow for various materials, thus giving the best effect as regards speed and a smooth bore with sharp edges and without any liability of cracking or spoiling the surface.

The Diamond Expansion Bolt Co. will be glad to send further particulars and descriptions of this drill to such as have use for it.

MECHANIC'S HAND TOOLS.

The Peck, Stow & Wilcox Company, 32 Murray street, New York, are sending out to interested contractors, carpenters, machinists, electricians, tinsmiths, etc., their complete catalogue of tools and appliances for use by the above mentioned trades.

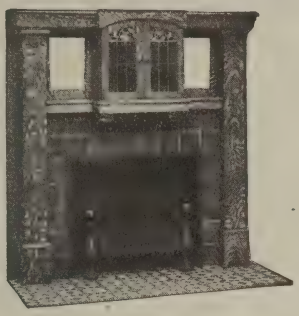
The catalogue is divided into convenient sections devoted to braces and auger bits, chisels, gauges and drawing knives, steel squares, hatchets and hammers, pliers and wrenches, tinner's hand shears and metal working tools, and miscellaneous hand tools. The various sections are preceded by a designed title page, with introductions calling attention to the interesting and special features of that particular group of tools. There is also a general introduction giving a great deal of useful information, as well as a complete index.

Among the items of special interest we find the Sampson brace with ball bearing chuck; Sampson solid center single twist auger bits; expansive auger bits; the large and complete line of chisels, gauges and drawing knives; rafter framing square, and the Sampson Take-Down square; a very extensive line of box-joint and lap-joint pliers and splicing clamps, and a solid handled wrench made with but three pieces, exclusive of the wood facing of the handle. All of these tools are manufactured exclusively by the Peck, Stow & Wilcox Co., from their own designs.

This catalogue No. 12B, is of special interest to the dealer, as well as to the contractor and carpenter, as it describes in great detail the various tools above mentioned.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

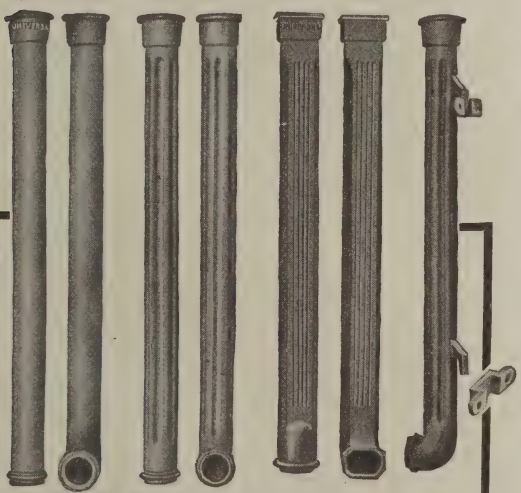
MANTELS
AND FIREPLACES



BEFORE building or remodeling, be sure to send for our large new Catalog, describing the most complete line of Colonial, Mission, and Standard Mantels in the country. Also brick mantels and a large selection of fireplace fixtures, consoles, colonnades, etc.

All Our Goods Are Guaranteed As to Quality

CHAS. F. LORENZEN & CO.
703-709 N. Sangamon Street, CHICAGO, ILL.



"UNIVERSAL" Cast Iron Conductor Connections

—and Boots. The kind that never rust—that last as long as the building—that permit the maximum length of service from the whole conductor pipe.

Fit all standard conductor pipe, are easily fitted, and can be removed and replaced by one man without injury to walls. Write for Circular No. "A-5"

Don't you want our booklet "B 5" on our line of Builders Supplies—sidewalks, doors, coal chutes, etc.

THE CANTON FOUNDRY & MACHINE CO., CANTON, OHIO

YOUR MATERIAL BILLS AND NOT YOUR LABOR COST

Will Make That Contract a Profit Job or a Loss.

Labor costs you as much as it does your competitor—but your materials need not. Knowing where to buy the best materials at the lowest prices means more contracts and bigger profits for *you*.

You will save from 40% to 60% by buying your lumber and mill-work direct from our mills. When you buy lumber and mill-work from the retail dealer you pay the profits of the wholesaler, the jobber, the commission man, the salesman and the retailer. These five profits add 40% to 60% to the cost of your materials.

A national authority on building in a recent article to contractors and builders says:

"Make sure you are not paying too high for your supplies. If your competitor is buying supplies cheaper than you, you are working at a big disadvantage. Very often a two-cent stamp spent in an inquiry for a price on something advertised * * * that you are using will get you a better price on something you want, and stop another leak hole in your business."

Stop the leak! Cut out the greedy middlemen and save their profits.

We own our timber, our logging camps and railways and our six mills.

WE GUARANTEE ALL OF OUR MATERIAL, and will refund your money promptly if you are not entirely satisfied. We ship promptly, and there are never any shortages to delay your work.

Send stamps for our big free material price list, or send us your plans, house bills or material lists and our estimators will figure your material costs. All our prices are freight paid. Compare our prices with the best you can get from your local dealers and see how much money you can save—then figure how much more profit this means to you. **SEND IN THE COUPON TODAY!**

Hewitt-Lea-Funck Co.
HIGH IN QUALITY LOW IN PRICE FIRST IN SHIPMENT
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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE CONTRACTOR AND THE TYPEWRITER.

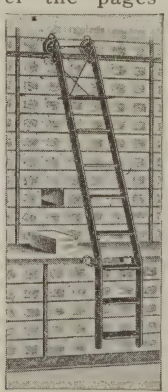
The up-to-date contractor is quick to see the advantage of a new style of saw rig, a patent folding scaffold bracket and other labor-saving devices which pertain to the work on the job. The use of these machines saves him actual and visible money, for he can see the time saving effect of their use as well as the improved quality of the work.

When this same contractor transacts his business with the owner, the material man or the architect, how often we see him writing out his communications in long-hand, running the risk of making mistakes and possibly his writing not being any too legible. How much better it would be to have his letters, statements, orders, etc., clearly typewritten that there might be no possibility of a misunderstanding? The clean cut figures and letters also indicate very clearly the nature of the contractor. He is up-to-date in using up-to-date methods on the job, and he is also up-to-date in the business end, using up-to-date methods there. It reflects on all of his work and particularly upon the ones who are most easily impressed with his business ability and who are most influenced by his business methods.

The Emerson Typewriter Co., Box 307, Woodstock, Ill., are placing on the market a typewriter designed to meet the needs of the busy contractor. The thousands of machines in use indicate its value in other lines of business and indicates to the contractor that by using the Emerson machine, he is in catalogue of the Emerson Typewriter Co. describes in detail their different models of machines so that the contractor can select the one best suited to his purpose. This catalogue is sent free on request.

MILBRADT ROLLING STEPLADDERS.

A great many contractors are wondering what they can do to secure work during the winter months. It would seem that looking over the pages of THE NATIONAL BUILDER would suggest to them a great many ways in which their skill could be put to good use. One of these is by installing Milbradt rolling stepladders in dry goods, grocery and other stores. This stepladder is designed to take the place of the old fashioned movable ladder, chairs, etc., and obviates the necessity of standing on counters, etc., to reach goods on the higher shelves. This rolling stepladder, manufactured by the Milbradt Mfg. Co., 1442 N. 8th street, St. Louis, Mo., is readily installed in new or old buildings. The use of a ladder of this character renders the upper shelves as accessible as the lower, thus greatly increasing the value of the wall space.



Catalogue No. 28 of the above company contains descriptions of their various styles of ladders and tracks, with directions for measuring, ordering, etc.

WOOD MANTELS OF QUALITY.

Factory organization and the employment of the very best talent and skilled workmen are the reasons given by the Huber Builders' Material Company, 39-43 Vine street, Cincinnati, O., for the reputation which they have for the elegance and quality of their mantels and other high-grade interior finish. The latest catalogue of this enterprising company shows mantels in a wide range of style from Mission to Colonial and the various kinds of wood. A photographic detail indicates the care used in the selection of materials, as well as in the design and manufacture.

But it is not alone in mantels that the Huber Builders' Material Company have made an enviable reputation. Their doors, sash, frames, flooring, and other building supplies have set a high standard and their customers receive the benefit through the fine appearance of the work which results. The Huber Builders' Material Company will be pleased to send their catalogues to those interested in the highest grade of building materials.

NORTHERN WHITE PINE.

No member of the Pine family is more tenacious of life than the White and Norway Pine. Originally covering vast forests through the Northern states, a large portion has already been cut off, but their place has been taken by a second growth, much of which is now in merchantable sizes. The conservation methods adopted by the large lumber interests is having its effect in the increased amount of fine lumber available. Even at the present, large annual cutting, the increase in available timber keeps up with the cut. Large areas in the timber regions are fit only for lumbering and the natural re-forestration of these districts is now being carefully conserved. There is little likelihood that the supply of White and Norway Pine will ever give out.

The advantages of this excellent wood are too well known to need repetition here. Its beautiful texture, grain and finishing qualities, with its capacity for taking and holding paint, makes it one of the best woods for general use. Its lightness and freedom from shrinkage after once in place makes it especially valuable. When properly put in place and protected, its life far exceeds the rest of the house, and it is no uncommon occurrence to have the timbers, framing, doors, trim, etc., of an old house used in a new one.

The Northern Pine Manufacturers Association, 1118 Lumber Exchange, Minneapolis, Minn., has prepared an interesting booklet on "White Pine Value in Home Building." This booklet is sent free to our readers and it will prove of interest to them.

THE EXCELSIOR DUMB WAITER

Sent Complete to a Nail **$18.50**

Knocked Down, Ready To Erect

Self Retaining Machine. Hardwood Car. Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one.

Send for Descriptive Pamphlet

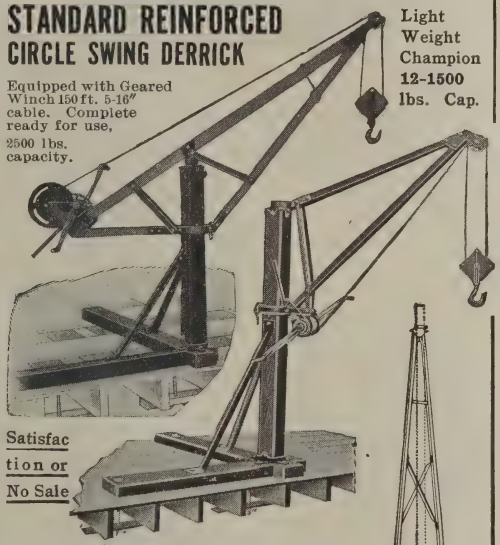
R. M. RODGERS & CO.

74 Emerson Place, Brooklyn, N. Y.

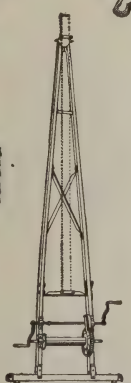
STANDARD REINFORCED CIRCLE SWING DERRICK

Equipped with Geared Winch 150 ft. 5-16" cable. Complete ready for use, 2500 lbs. capacity.

Light Weight Champion 12-1500 lbs. Cap.



Satisfaction or No Sale



Top Point Setter Derrick

Write for Illustrated Catalog "N" showing complete line of

BUILDERS' DERRICKS

We will exhibit at PITTSBURG and CHICAGO CEMENT SHOWS

SASGEN BROS.

2053-57 Racine Ave., CHICAGO, ILL.

REG. U. S. PAT. OFF.

P. S. & W. TRADE MARK TOOLS GUARANTEED

This trade-mark, "The MARK of the MAKER," is a guarantee of the highest known quality in hand-tools. Always look for it.

WHAT MAKES A P. S. & W. CHISEL HOLD ITS EDGE

First—It's the quality of the steel. These chisels are all forged from solid bars of the best English tool steel, with genuine Norway iron in the sockets.

Second—It's the superior hardening and tempering, due to the P. S. & W. knowledge and experience that goes way back to 1819.

Third—It's a dozen different points of skill and care possible only to the largest chisel makers of America.

P. S. & W. Guaranteed Tools for Carpenters

Among many other items are Braces, Auger Bits, Chisels, Gouges, Draw-Knives, Squares, Pliers, Calipers, Hatchets, Hammers, etc. etc.

Write for a free copy of the "Mechanics' Handy List", a 170-page book, listing over 200 tools and including 35 pages of valuable information for daily use.

The Peck, Stow & Wilcox Co.

Manufacturers
of the Largest Line of Mechanic's Hand-Tools Offered by Any Maker

Southington, Conn. New York, N.Y. Cleveland, Ohio

Address 32 Murray St., New York City

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

WOOD MOSAIC FLOORS.

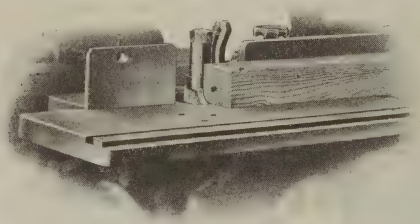
When the carpenter is wondering what to do during the winter months, why wouldn't it be a good plan to call on his neighbors and friends and keep his eyes on the floor for a few minutes. He would doubtless find that many of the floors are in anything but first-class condition. He will find soft wood floors worn into hollows and ridges, with ten-penny nails sticking out at intervals. He will find so-called hardwood floors put down when the wood was green and the building was damp that now have opened up so he can see through into the cellar. He will find floors discolored, as well as worn out, and painted to keep other defects from being noticeable; incidentally the paint will be worn off in spots.

The enterprising carpenter will, thereupon, mention the fact that it is possible to put down a first-class floor over the old one, and he will be asked what kind of a floor he personally recommends. If he has been an intelligent reader of the NATIONAL BUILDER, he will be posted on the merits of wood-mosaic floors, and also be prepared to give prices on laying them. Of course, he has catalogues showing the different patterns in which wood-mosaic is made, and the deal can probably be closed then and there.

To such of our readers as have overlooked this subject we would suggest that they write to the Wood Mosaic Company, 33 Hebard street, Rochester, N. Y., and ask them for all the information they can give to an inquiring contractor.

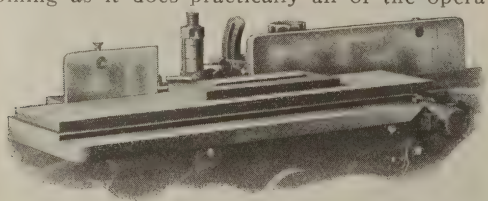
THE CRESCENT UNIVERSAL WOOD-WORKER.

The shop which can afford any one machine must be supplied with one which will do a wide variety of work. The No. 51 Crescent Universal Wood-Worker made by the Crescent



Shaper Head.

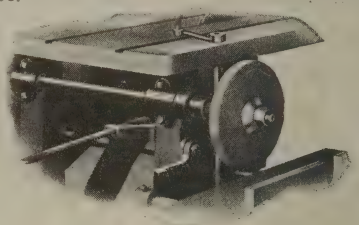
Machine Co., 10 Main street, Leetonia, O., is designed for just such a place as this, combining as it does practically all of the opera-



Attachment for Tenoning.

tions usually required in a small planing mill, such as cross and rip sawing, band sawing, jointing, shaping, boring, sanding, grinding, etc. It is able to replace machines which would otherwise require several times the space it occupies, and frequently more space than the small shop could permit.

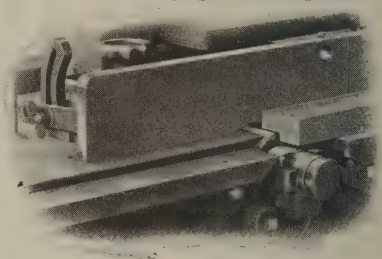
A combination machine of this character requires less power than the large assortment of machines requiring shafting, belting, pulleys, etc.



Emery Grinder.

While only one machine is required, several operations may be done at one time; for instance, a band saw, rip or cross cut saw, shaper or boring, sanding and grinding attachment, may be used all at the same time without interference.

We show on this page detail parts of this



Attachment for Jointing.

interesting machine, showing the shaper, tenoner, grinding attachment and jointer.

The complete catalogue of the No. 51 Crescent Universal Wood Worker will be sent on request and we believe that all of our readers should have it that they may be posted on the work which a machine of this character will do.

BAY STATE BRICK & CEMENT COATINGS.

Every builder recognizes the importance of protecting the exterior of concrete and cement construction against damage by moisture and frost, but few realizes that it is also possible to give the building any desired tint, making the concrete or stucco house just as susceptible to exterior decoration as a frame building.

Wadsworth, Howland & Co., 82-84 Washington street, Chicago, Ill., have recently issued booklet No. 10 showing the advantages of their Bay State Brick and Cement Coating on work of this character, as well as for preserving brick and wood surfaces. How much better it is to finish the exposed surfaces of buildings in pleasing and harmonious colors than to leave them in the incongruous colors of the raw materials? This booklet is sent to our readers on request and will prove of value to them in completing their work.

WE INITIATE—NEVER IMITATE

Storm-Proof Hanger

Distinctive Features

Easy running.

Anti-Friction steel-roller bearings.

Frictionless contact with rail.

Great strength and durability.

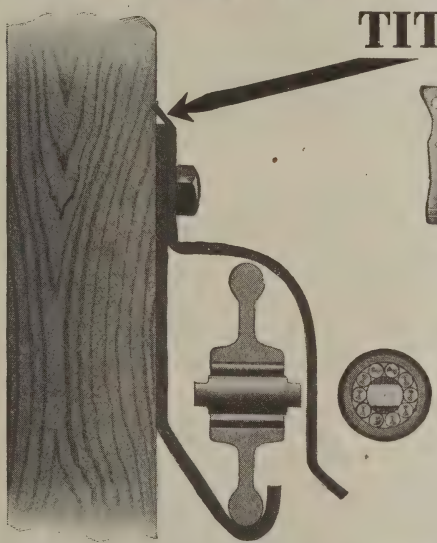
Illustrated directions packed with each pair.

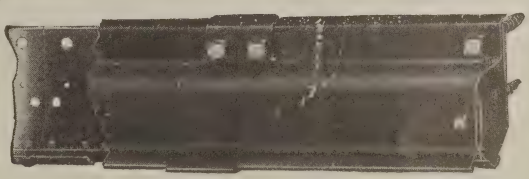
The cut shows the No. 66 Rigid style.

The No. 77 has a flexible Hinge Joint.

STORM-PROOF RAIL

TITE-FIT





Requires no brackets.

Forms a continuous bracket in itself.

Requires no housing. Fits close against the building. (See sectional view.)

Perfect tread for hanger wheels. Bird- and Storm-proof.

A detailed description will be found in our general catalog, a copy of which will be gladly mailed on request.

NATIONAL MFG. COMPANY

STERLING, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT. BUILDER

SURE-EYE THE CONTRACTOR.

By Jack Dahlton.

Sure-Eye the contractor hit the trail with a bunch of National Builders, catalogues, and numerous samples of building materials in his pack. He was after Big-Wigwam-for-Little-Money, who had sent word that the blue prints had arrived.

Now, Big-Wigwam-for Little-Money was one of the "I'll-Build-Some-Day Tribe." He had glanced at the ads in the popular magazines. He had written for some of the catalogues the manufacturers wanted him to have. But he wasn't quite sure down in his heart that his opinions on building materials, heating plants, etc., which he wanted for his new Wigwam, were correct.

Big-Wigwam-for-Little-Money was a busy man. He did not have time to personally investigate everything going into the new Wigwam. He was only building once in a life time. He had some decided preferences as to materials, but he would be guided by what Sure-Eye said.

Big-Wigwam-for-Little-Money had sense enough to know that Sure-Eye the contractor was thoroughly posted. Sure-Eye had spent all his life buying and handling all kinds of building materials. He built an average of ten houses, a church or library, a theater or factory every year.

He knew how certain materials would act in certain places and conditions. That's why Big-Wigwam-for-Little-Money needed his advice. Besides, he knew Sure-Eye was absolutely reliable. The blue prints showed a nice plan. Big-Wigwam-for-Little-Money had seen the colored perspective view in the "Squaws Sporting Gazette." Mrs. Big-Wigwam-for-Little-Money had seen it first. It was one of those scrambled egg affairs, scattered all about and spilling over the sides of the lot, with the kitchen in front where the parlor used to be when we were papooses, and the place to crawl in was so disguised that it would take company three trips clear around to find that door.

OAK FLOORING

Increases the Renting and Selling Values and Attracts a Better Class of Tenants

Builders and **owners** will find it a clinching argument to say, "It's floored with OAK FLOORING." It imparts an air of **refinement** and **elegance. It is the modern flooring.**

OAK FLOORING ⅜″ thickness by 1½″ or 2″ face can be laid **over old floors** in old homes or over cheap sub-floors in new homes **at a very low cost.** it is **cheaper than carpets** or **pine flooring.** When laid it has all the appearance of heavy flooring.

There is a **solid satisfaction** and **lasting pleasure** in the **substantial** and **dignified appearance** of OAK FLOORING.

Contractors and carpenters find it very profitable to lay ⅜″ stock over old floors in old homes during dull periods. A little **canvassing** is all that is necessary to **secure** jobs.

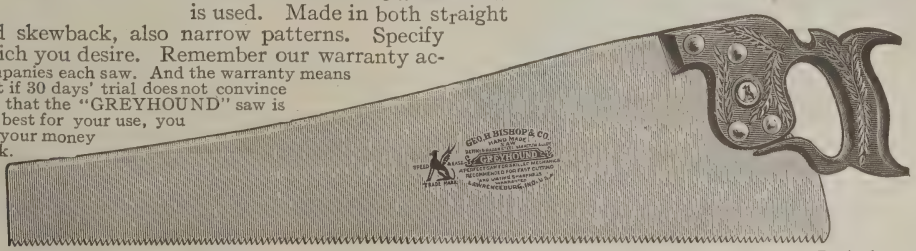
For **durability** OAK is the **best.** OAK FLOORING laid thirty years ago, after very hard use, is still in good condition. ¶ **WRITE FOR BOOKLET.**

THE OAK FLOORING BUREAU, 897 Hammond Building, Detroit, Michigan

Greyhound Hand Saws

The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. ***This saw will be imitated by others—but not equalled.***

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the best for your use, you get your money back.



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Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		

Order one today and let us take all the risk. If you want literature first, write us

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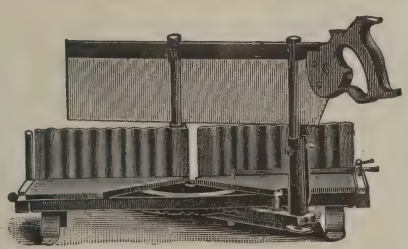
GOODELL MITRE BOX



MADE OF STEEL—CANNOT BREAK

First in Quality and Improvements

Automatic stops for holding up saw. Corrugated Backs. Graduated. Gauge for duplicate cuts and many other features. If you want the best you will take no other.

SEND FOR CIRCULAR E

GOODELL MFG. CO. GREENFIELD, MASS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT. BUILDER

YES, YOU *CAN* GET IT!

You can get all you want of it! Just put a "MUST" on your order—and don't let anybody sell you any other lumber when you know that what you WANT is

"That's Good New

"WHITE PINE

There's *no way to make THIS Good News too strong* to suit the skilled and experienced *Carpenter* or *Contractor.* When he hears that (HE and YOU) CAN GET ALL THE WHITE PINE HE (or YOU) CAN WISH FOR — GET IT in any quantity—any place—any time—HE and YOU are Glad. (YOU KNOW VALUES.) You may have to do some INSISTING—and some *refusing of substitutes* — BUT WHITE PINE *is Worth All the Insisting that's Necessary.*

NORTHERN PINE
MANUFACTURERS' ASSOCIATION

1118 Lumber Exchange, **MINNEAPOLIS, MINN.**

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IT WILL HELP.

WHITE (or NORWAY) PINE!

s: Tell It Again!"

ND PLENTY OF IT"

e One Best Wood For Your TOOLS.
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Vhen you know what you want—
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VHITE PINE (or NORWAY)
The Wood America
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ON'T TAKE ANY
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YOU WRITE

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Sure-Eye's business was building wigwams, so he opened up some copies of the National Builder. With these he explained how he proposed to make certain changes and about how they would look. He showed many samples of building materials he had obtained from National Builder advertisers. He economized in certain places where it could be done without injury.

But he had built too many homes to make the error of letting Big-Wigwam-for-Little-Money put on a cheap lock—set on a beautifully designed and manufactured door. Instead, he specified a lock-set that would add to the fine appearance of not only that door, but of the whole room.

Sure-Eye after a number of rough sketches and a lot of figuring, finally made it possible for Big-Wigwam-for-Little-Money to get his 25x125 foot bungalow on his 25x125 foot lot, with all the shrubbery-clinging vines, and even the garden for the papooses to play in, and also do it within the means of the owner.

It's such contractors as Sure-Eye, specifying and buying the best materials and keeping posted on building conditions, who make it possible for many a person to own their own home.

Amatite ROOFING

Mineral Surfaced— Needs No Painting

EVERYTHING about Amatite appeals to the man with common sense. He can see its superiority at once—the real mineral surface *which never needs painting*, the two layers of Pitch, which is the greatest waterproofing material known; the two layers of heavy Tarred Felt—all these contribute to the popularity of Amatite.

We can make Amatite better and cheaper than anyone else on account of our greater facilities, and consequently we sell it at a surprisingly low figure.

Simply the fact that it needs no painting is enough to make a man sit up and take notice—especially the man who has spent time and money in painting and repainting smooth surfaced roofings.

Write to-day for further information.

Barrett Manufacturing Company

New York Chicago Philadelphia Boston St. Louis Cleveland Pittsburgh Cincinnati Kansas City Minneapolis Seattle

Corey, Ala.

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How this Contractor Got the Job at Highest Price

There's a money-making suggestion here for you.

"I commenced a job this morning which I got although I was the highest bidder. My bid was accepted on account of being able to complete the work fifteen days sooner than the other contractor, because I am using Compo-Board * * * Here is what happened on another job. Compo-Board delivered yesterday at 3 p. m.—put up at 11 a. m. today, papered at 2 p. m.—and the room will be occupied tonight. I have used Compo-Board on cold, damp walls and it has given entire satisfaction." —John B. Walls, Philadelphia, Pa.

You can afford to specify or recommend only a wall board that will give the greatest satisfaction. You're safe in recommending Compo-Board. It's not only impervious to heat, cold, moisture, vermin, not only fire-resisting and non-warping, strong and durable, but it has several exclusive features. Can be papered, painted or kalsomined just as satisfactorily as a plastered wall, with or without panels.

Send your name on a postal card for free booklet and sample. Learn why the government and others who know prefer Compo-Board. It may be the most profitable postal card you ever wrote.

Northwestern Compo-Board Co.

5776 Lyndale Ave. No., Minneapolis, Minn.

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My First Contract

A beginning must be made in any business, and in contracting the first job always develops a lot of difficulties which the contractor never dreamed could arise. His experience as a mechanic, or possibly an office man, indicated to him many of the points which would arise. On these he could be more or less on the lookout for, but the thousand and one things which came up from day to day on the job caused him anxiety and possibly loss of time and money.

The NATIONAL BUILDER has repeatedly called attention to the troubles of the beginner. We now want the experienced contractor to tell us about *his* first contract; what troubles arose and how they were overcome; how much money was made or lost; in fact, everything that the beginner would want to know before starting in the concontracting business for himself,

For the best article on this subject, we will pay $10.00.

For the second best, $5.00.

For each of the others which we can use, we will pay at our regular rates on publication.

Everyone who has been a contractor is eligible. The articles should not exceed twenty-five hundred words, and must be in this office not later than February 1st. The announcement of the prize winners, with their articles, will be published in the following issue.

CONTRACTOR'S CONTEST

THE NATIONAL BUILDER, CHICAGO

537 South Dearborn Street

WHEN YOU GET TO **SASH CORD use SILVER LAKE**

and insist upon getting it from your dealer. To insure you against substitution, we stamp our name upon every foot of our cord. Carried by all dealers.

SILVER LAKE BRAIDED SASH CORD was originated by us, and for forty years has been recognized as **THE STANDARD**

Established 1869

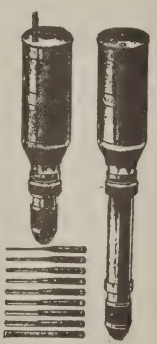
An Automatic Boring Tool that Fits Your Pocket

This is a mighty handy, convenient tool. It is compact and when compressed can be carried in the pocket. But set it to work and you'll find it has all the good qualities of larger and more expensive borers.

STAR BORER No. 8

has cells in the handle holding eight drill points ranging in size from 1/16 inch to 11/64 inch, and numbered from 1 to 8. Cell No. 9 contains a small screwdriver to be used when the tool is compressed, with the plunger forced back into the handle and held there.

The price of this Auto Pocket Borer is ***$2.00.*** Look for the name—***MILLERS FALLS.***



Our book "Tool Practice" is FREE—Send for it

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KOLL'S PATENT **Lock Joint Columns**

Hot Off the Press

Our trade bulletin No. 1 containing valuable information for the Architect, Woodworker and Builder. All the information you need regarding wood columns. This is free for the asking.

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ÆTNA-IZED?

DISASTER-DISABILITY-DEATH

Are all unpreventable and mean loss of income. This loss is inevitable unless forestalled by the absolute protection of

ÆTNA DISABILITY INSURANCE

This insurance will protect your income and the income of your family. For a moderate investment the Ætna Life Insurance Company will provide you

INCOME INSURANCE

by protecting you and yours against loss by accidental injury or death or by disease. The cost is very low compared with the benefits it guarantees.

Ætna policies are free from technical restrictions and provide liberal compensations for losses sustained through accident or illness.

SEND THE COUPON TO-DAY

Ætna Life Insurance Co. (Drawer 1341) **Hartford, Conn.** Nat'l Builder Tear off

I am under 60 years of age and in good health. Tell me about ÆTNA Disability Insurance
My name, business address and occupation are written below.

BOOKS - BOOKS - BOOKS - BOOKS

For the Busy Contractor
For the Hustling Builder
For the Wide-Awake Mechanic
For the Studious Apprentice

NOW is the time for the contractor, builder, mechanic and apprentice to study up on some of the problems which have stumped him the past summer. The books shown on this and the following pages are selected for their particular value to the busy man as well as for the student. Every phase of the building trade is treated in a logical and forceful manner by the writers (many of them contractors themselves) and are especially adapted to the needs of the all-around man.

You may not be able to afford them all. Select the ones suited to your particular needs, and order NOW.

These are only a few of the bookswe sell. Ask for our complete catalog—it is free.

ANY BOOK SENT POSTPAID TO ANY ADDRESS UPON RECEIPT OF PRICE

HODGSON BOOK CO., 537 S. Dearborn St., Chicago

Guide and Assistant for Carpenters and Mechanics. By H. G. Richey. A full and complete treatise on carpentry and building, illustrated by about 200 engravings. This book is full of information for architects, builders and practical carpenters, and contains tables of weights and strength of materials; receipts and a large amount of useful material carefully compiled for the use of practical men. Large octavo; bound in cloth $1.00

Bungalows, Camps and Mountain Houses. Seventy separate designs, exteriors, interiors, and floor plans, with hints on selection of site, sanitation, layout and construction. Price.....$2.00

Two-Family and Twin Houses. Consisting of a variety of designs contributed by 25 leading architects in all parts of the country, showing the latest ideas in planning of this class of dwellings in city, village and suburbs with a complete description covering all the latest improvements in sanitation, heating, lighting, etc. Illustrated, boards.....$2.00

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The Up-to-Date Hardwood Finisher. (Two Parts in One.) By Fred T. Hodgson, F. A. I. C., 320 pages, 117 illustrations. Cloth. Part I gives rules and methods for working hard woods, care of tools, use of glue, etc. Part II treats of filling, staining, varnishing, polishing, gilding and enameling $1.00

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Vol. II. Similar to Vol. I, on advanced lines. Many of the more difficult problems of construction are solved fully and plainly. The author's method of explanation being adapted to the class of readers most apt to study the subjects. Cloth $1.00

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Easy Steps to Architecture. Particularly designed for Home Study. 350 pages, 230 illustrations. A text book for mechanics in the building trades. The principles of architecture showing the classic orders and later styles. Cloth $1.50

Builders' Architectural Drawing Self Taught. By Fred T. Hodgson. 250 illustrations and 18 folding plates. For carpenters and students of architecture and those who wish to learn drawing at home and have not the means to take the courses in school, college, or a correspondence course. Rules for simple drawings, including a complete plan of a cottage. Cloth $2.00

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Concretes, Cements, Mortars, Plasters and Stuccos. How to Make and How to Use Them. By Fred T. Hodgson. 520 pages, 150 illustrations. Prepared by a practical man for other practical men, containing nearly all the matter obtainable from all sources up to the present time. Cloth $1.50

The Twentieth Century Bricklayer and Mason's Assistant. By Fred T. Hodgson. 305 pages, 450 illustrations. A complete encyclopedia of bricklaying knowledge, invaluable to the working bricklayer, general builder and contractor. Arches, gauged work, angles, etc. A portion given to the stone work which a bricklayer ordinarily does. Cloth.....$1.50

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Practical Up-to-Date Plumbing. By George B. Clow. 310 pages. Over 250 illustrations. Contains useful information on the matter of sanitary plumbing, especially for residence work, including a number of valuable tables and over fifty carefully prepared drawings showing piping connections for all classes of buildings. Cloth $1.50

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The Practical Cabinet Maker and Furniture Designer. By Fred T. Hodgson. A new book on cabinet making to aid young workmen making all kinds of furniture from the simplest mission to the most elaborate styles. The illustrations enable the student to recognize the styles of pieces of furniture on sight. Cloth $2.00

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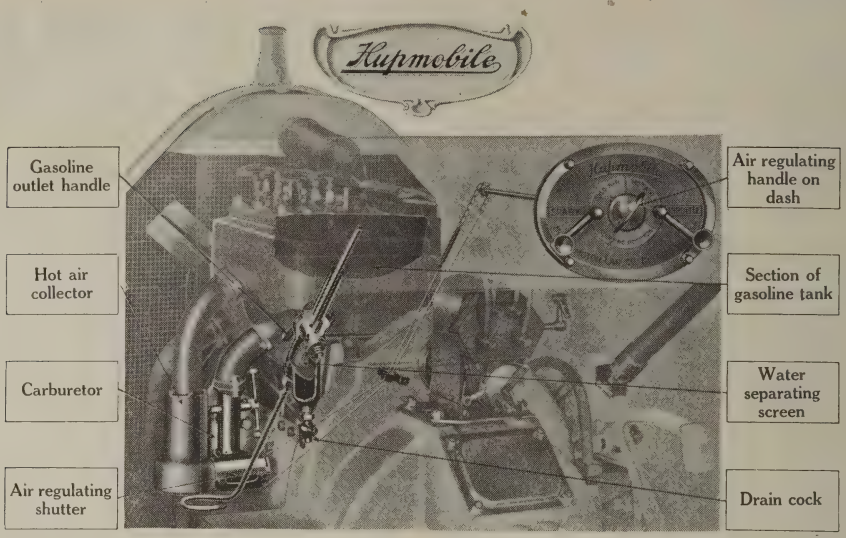

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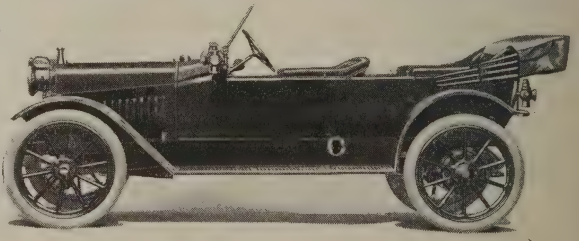

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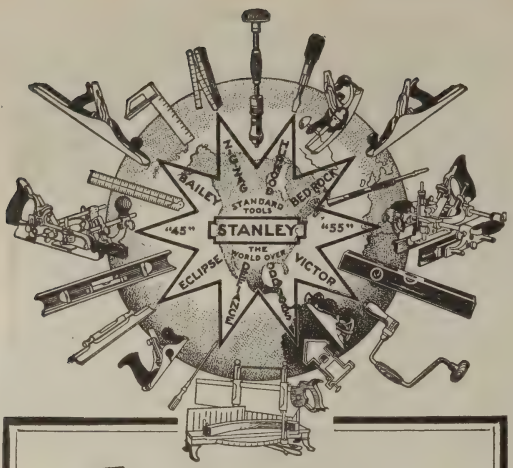

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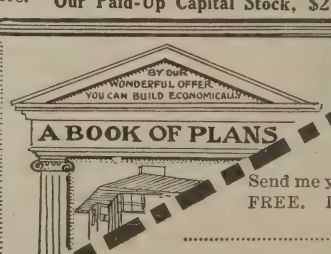

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